

**INDOOR AIR MONITORING
REPORT**

**Grenada Manufacturing Site
Grenada, Mississippi**

prepared for

ArvinMeritor, Troy, Michigan

December 2004

27-26322.002

501 Great Circle Road
Suite 150
Nashville, Tennessee 37228
Tel: (615) 255-2288
Fax: (615) 256-8332
www.brownandcaldwell.com

December 20, 2004

126322.002



Mr. Donald Webster
USEPA Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

RE: Draft Indoor Air Monitoring Report
Grenada Manufacturing Facility
Grenada, Mississippi
USEPA ID No.: MSD 007 037 278


Dear Mr. Webster:

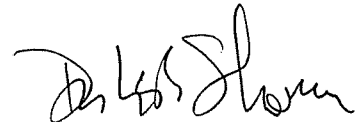
Enclosed are two (2) copies of the report entitled "Indoor Air Monitoring Report", dated December 2004. This report presents the methodology and findings of the air monitoring sampling activities conducted at the Grenada Manufacturing facility on February 17, 2003 and August 18, 2004. Two copies were also submitted to MDEQ for review.

We look forward to receiving your review comments regarding this project. If you have any questions or comments, please feel free to call us at (615) 255-2288.

Sincerely,

BROWN AND CALDWELL


M. Maria Megehee
Project Manager
Environmental Services


Dale Showers, P.E.
Engineering Manager
Environmental Services

cc: Toby Cook, MDEQ (2 copies)
John Bozick, ArvinMeritor
Don Williams, Grenada Mfg. (2 copies)
Jeffrey Karp, Swidler Berlin Shereff Friedman, LLC
Jim Thomas, Collins & Aikman

CONTENTS

CONTENTS	i
TABLES	ii
FIGURES	ii
1.0 Introduction	1-1
1.1 Background.....	1-1
1.2 Report Organization.....	1-2
2.0 Sampling Strategy	2-1
2.1 Target Indoor Air Concentrations For COCs.....	2-1
2.2 Air Handling Systems Used in Main Plant Building.....	2-2
2.3 Work Space Usage and Work Shift Hours	2-4
2.3.1 Work Space Usage and Work Shift Hours for February 2003.....	2-4
2.3.2 Work Space Usage and Work Shift Hours for August 2004.....	2-5
2.4 Summary of Sampling Strategy.....	2-6
3.0 Sampling Description	3-1
3.1 Qualitative Indoor Air Survey.....	3-1
3.2 Indoor Air Sampling Procedures and Methods	3-2
3.3 Indoor Air Sample Collection.....	3-2
3.3.1 Indoor Air Sample Collection for February 2003.....	3-2
3.3.2 Indoor Air Sample Collection for August 2004	3-3
4.0 Indoor Air Sampling Results	4-1
4.1 Qualitative Indoor Air Sampling Results	4-1
4.1.1 Qualitative Results from the February 2003 Air Sampling Event.....	4-1
4.1.2 Qualitative Results from the August 2004 Air Sampling Event	4-3
4.2 Air Sampling Results for the COCs.....	4-4
4.2.1 February 2003 Air Sampling Results for the COCs.....	4-4
4.2.2 August 2004 Air Sampling Results for the COCs.....	4-6
4.3 Evaluation of Air Sampling Results	4-7
4.3.1 Evaluation of February 2003 Results	4-7
4.3.2 Evaluation of August 2004 Results	4-8
5.0 Conclusions	5-1

APPENDICES

APPENDIX A. USEPA OTS Memorandum Dated June 16, 2003 and May 17, 2004

APPENDIX B. Analytical Laboratory Results for February 2003 Indoor Air Samples

APPENDIX C. Analytical Laboratory Results for August 2004 Indoor Air Samples

TABLES

<u>No.</u>		<u>Follows Page</u>
2-1	Target Indoor Air Screening Concentrations for VOCs in Main Plant Building February 2003 and August 2004	2-1
3-1	Summary of Air Samples for Analysis from Main Plant Building February 2003 and August 2004	3-3
4-1	Summary of Air Sampling Results and Comparison to Target Indoor Air Screening Concentrations and OSHA 8-hour TWA PELs February 2003	4-4
4-2	Summary of Air Sampling Results and Comparison to Target Indoor Air Screening Concentrations and OSHA 8-hour TWA PELs August 2004	4-6

FIGURES

<u>No.</u>		<u>Follows Page</u>
1-1	Site Location Map	1-1
1-2	Site Map Showing Location of Main Plant Building.....	1-1
2-1	Floor Plan of Main Plant Building February 2003	2-2
2-2	Floor Plan of Main Plant Building August 2004	2-2
3-1	Air Sampling Locations in Main Plant Building February 2003.....	3-3
3-2	Air Sampling Locations in Main Plant Building August 2004.....	3-4
4-1	Qualitative Indoor Air Survey Results February 2003.....	4-1
4-2	Qualitative Indoor Air Survey Results August 2004.....	4-3

1.0 INTRODUCTION

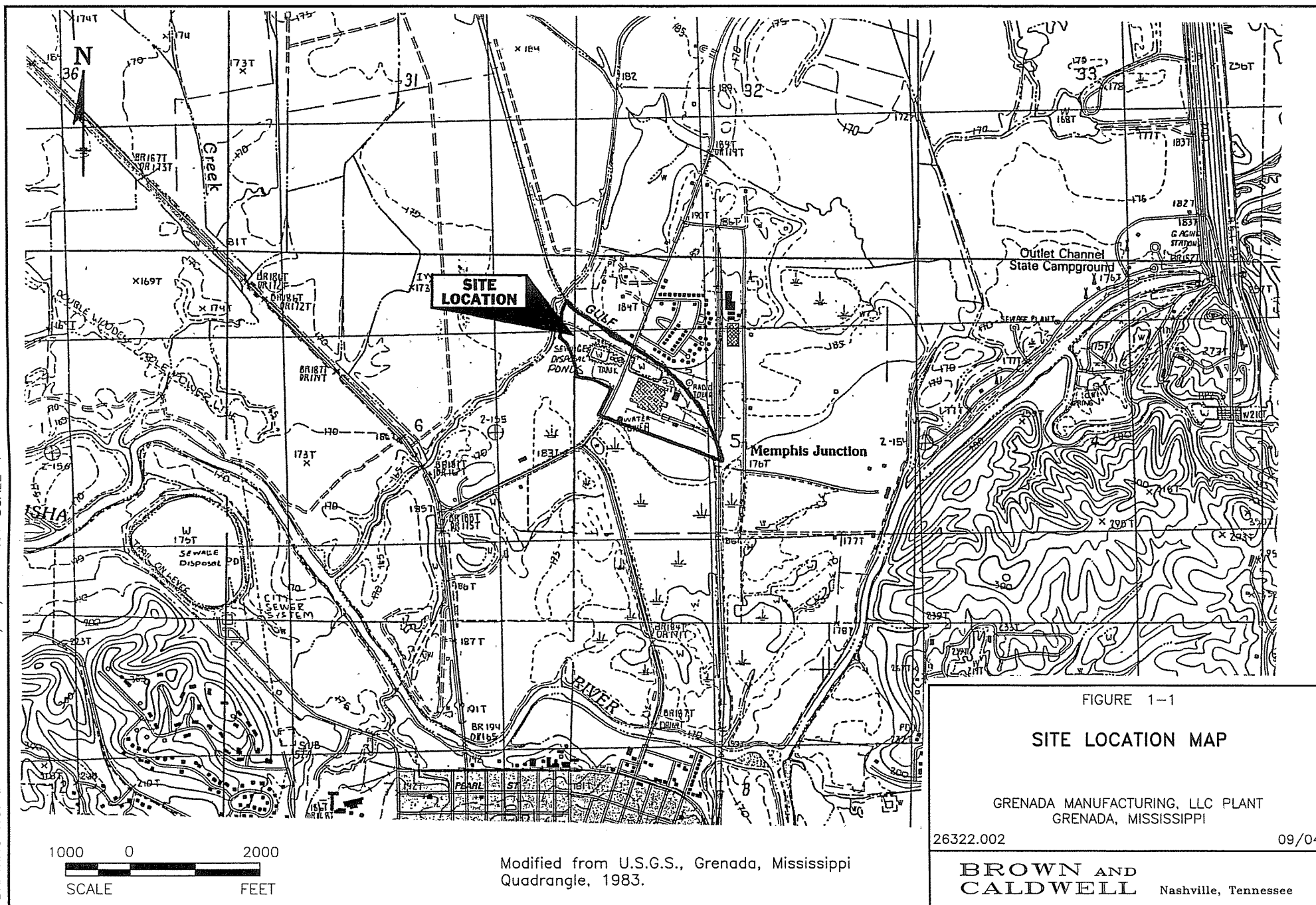
This Indoor Air Monitoring Report (Report) summarizes the air monitoring activities and results for the air monitoring that was performed on February 17, 2003 and August 18, 2004, in the main plant building at the Grenada Manufacturing, LLC facility (Site) located at 635 Highway 332 in Grenada, Mississippi (Figure 1-1). This Report also includes updated target indoor air concentrations for the constituents of concern (COCs) and addresses building modifications made during the time interval between sampling events. Figure 1-2 shows the location of the main plant building at the Site. Both monitoring events were performed in accordance with Brown and Caldwell's (BC) document entitled "Indoor Air Monitoring Work Plan" (Work Plan) as submitted to the United States Environmental Protection Agency (USEPA) in September 2002. The Work Plan, which was approved by the USEPA in its email dated December 26, 2002, addressed indoor air monitoring protocols for eleven volatile organic compounds (VOCs) in the main plant building at the Site.

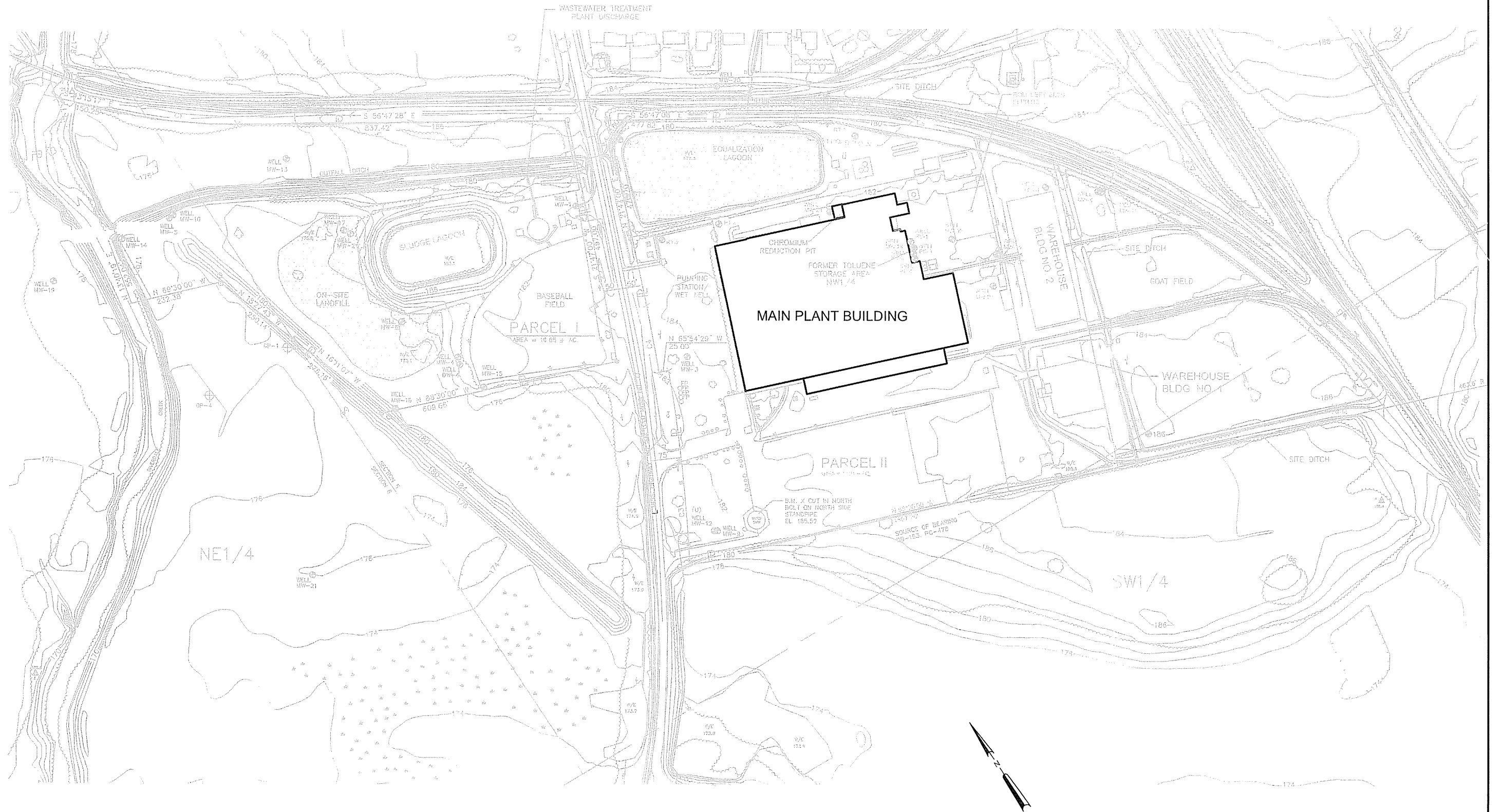
1.1 BACKGROUND

A Hazardous and Solid Waste Amendment (HSWA) Permit was issued July 31, 1998 for the Grenada Manufacturing facility. In accordance with its HSWA permit, the facility is undergoing Resource Conservation and Recovery Act (RCRA) Corrective Action at various solid waste management units (SWMUs) and areas of concern (AOCs). Grenada Manufacturing, LLC (Permittee) currently conducts a metal stamping operation at the facility.

As requested by the USEPA Region IV in a letter dated November 26, 2001, BC conducted an assessment of the potential for vapors from chemicals in the groundwater to be present in indoor air at the facility. This assessment was conducted using the draft guidance document "Supplemental Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway" dated October 23, 2001. This draft guidance was provided to BC by the USEPA prior to its publication in the Federal Register for public comment. This draft document provides guidance for assessing whether the subsurface vapor intrusion to indoor air pathway for human exposure is complete under Site conditions.

The results of the vapor intrusion assessment were presented in a letter to the USEPA dated February 26, 2002. The assessment identified ten VOCs that had the potential to exceed the target





LEGEND

- MONITORING WELL
- GEOPROBE PIEZOMETER



SOURCE: MAP PREPARED BY ALMON ASSOCIATES, 1993. WELL LOCATIONS SHOWN ARE APPROXIMATE.

FIGURE 1-2

SITE MAP SHOWING LOCATION
OF MAIN PLANT BUILDING

GRENADA MANUFACTURING, LLC PLANT
GRENADA, MISSISSIPPI
26322.002 09/04

BROWN AND CALDWELL Nashville, Tennessee

concentrations in at least one location for the groundwater monitoring wells that were identified as being near the main plant building. The assessment concluded that there were insufficient data at the time of the assessment to indicate whether the vapor to indoor air pathway is complete and if indoor air quality has been impacted. In its letter dated June 14, 2002, the USEPA requested that an Indoor Air Monitoring Work Plan be prepared for conducting indoor air monitoring to collect data to further assess the vapor to indoor air pathway, and also asked that another VOC, toluene, be added to the analyte list.

The draft report titled “Draft Indoor Air Monitoring Report, Grenada Manufacturing Site, Grenada, Mississippi” was submitted to the USEPA in April 2003. This report summarized the air monitoring activities and results for air monitoring that was conducted on February 17, 2003 at the Site. In a letter dated May 17, 2004, the USEPA indicated that additional indoor air sampling would be required at the Grenada Manufacturing facility to supplement the data from the February 17, 2003 sampling event. On behalf of Grenada Manufacturing, BC submitted a response letter to the USEPA on May 26, 2004. After follow-up conversations with the USEPA, the Agency, in its email to BC dated June 21, 2004, gave approval for Grenada Manufacturing to proceed with indoor air sampling in the Summer of 2004. The additional air monitoring occurred on August 18, 2004.

1.2 REPORT ORGANIZATION

The strategy for the sampling and a description of the sampling that was performed are presented in Sections 2 and 3, respectively. Section 4 presents the results of the sampling and includes an evaluation of the results. Conclusions are presented in Section 5. The USEPA OTS Memorandum dated June 16, 2003 is included in Appendix A. The analytical laboratory reports for the February 2003 and August 2004 air samples are included in Appendices B and C, respectively.

2.0 SAMPLING STRATEGY

The overall goal of the sampling plan was to deliver sampling results that were representative of the indoor air in the main plant building. The strategy for the indoor air sampling was developed for the eleven COCs using guidance from the USEPA draft Vapor Intrusion Guidance document and from a draft guidance document prepared by the Massachusetts Department of Environmental Protection (MADEP) entitled, "Indoor Air Sampling and Evaluation Guide," dated February 1, 2001, as well as BC's experience on similar assignments. Although the MADEP indoor air sampling guide is currently a draft for intra-agency policy deliberations, it was recommended by the Vapor Intrusion Guidance document as an excellent guide to indoor air sampling.

The sampling strategy included consideration of the following:

- Target indoor air concentrations for COCs,
- Air handling systems used in the main plant building, and
- Work space usage and work shift hours.

These parameters are described in the following sections, followed by a summary of the sampling strategy.

2.1 TARGET INDOOR AIR CONCENTRATIONS FOR COCs

Table 2-1 presents a list of the eleven VOCs that are COCs for this Report. The chemical abstracts service (CAS) numbers and target indoor air screening concentrations for each VOC are also presented in the table. The target indoor air screening concentrations presented in the April 2003 Draft Indoor Air Monitoring Report were obtained from Table 2a in the draft Vapor Intrusion Guidance document entitled "OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)", dated November 29, 2002, and correspond to a hazard index of 1 or a carcinogenic risk level of 10^{-4} (1 in 10,000). The target indoor air screening concentrations were used to help determine appropriate sampling and analytical methods that would have detection limits that are below the target concentrations for the February 2003 monitoring event. However, the USEPA, in an email to BC

Table 2-1

Target Indoor Air Screening Concentrations for COCs in Main Plant Building
February 2003 and August 2004
Grenada Manufacturing Site
Grenada, Mississippi

Chemical Name	CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b
		HI=1 (ppb _v)	Risk = 10 ⁻⁵ (ppb _v)
Benzene	71-43-2	NA	1.6
1,1-Dichloroethene	75-35-4	50	NA
1,2-Dichloroethane	107-06-2	NA	0.4
cis-1,2-Dichloroethene	156-59-2	8.8	NA
trans-1,2-Dichloroethene	156-60-5	18	NA
Methylene chloride	75-09-2	NA	25.4
Tetrachloroethene	127-18-4	NA	1 ^c
Trichloroethene	79-01-6	NA	3.7 ^c
1,1,2-Trichloroethane	79-00-5	NA	0.5
Toluene	108-88-3	110	NA
Vinyl chloride	75-01-4	NA	1.8

Notes:

^a Target Screening Concentrations were obtained from Table 2b (10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

dated June 21, 2004, requested that Grenada Manufacturing evaluate the sampling data using California EPA toxicity screening criteria for tetrachloroethene (PCE) and trichloroethene (TCE). These criteria are included in a memorandum from the USEPA's Office of Technical Services (OTS) (see Appendix A for a copy of the memo). The OTS also adjusted proposed screening levels for a 10^{-5} risk exposure to carcinogenic contaminants (benzene, 1,2-dichloroethane, methylene chloride, 1,1,2-trichloroethene (1,1,2-TCA), and vinyl chloride) in the commercial/industrial setting. For non-carcinogenic COCs (1,1-dichloroethene, cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene, and toluene) criteria from Table 2b of the Subsurface Vapor Institution Guidance (risk = 1×10^{-5}) were chosen. The screening levels are shown on Table 2-1.

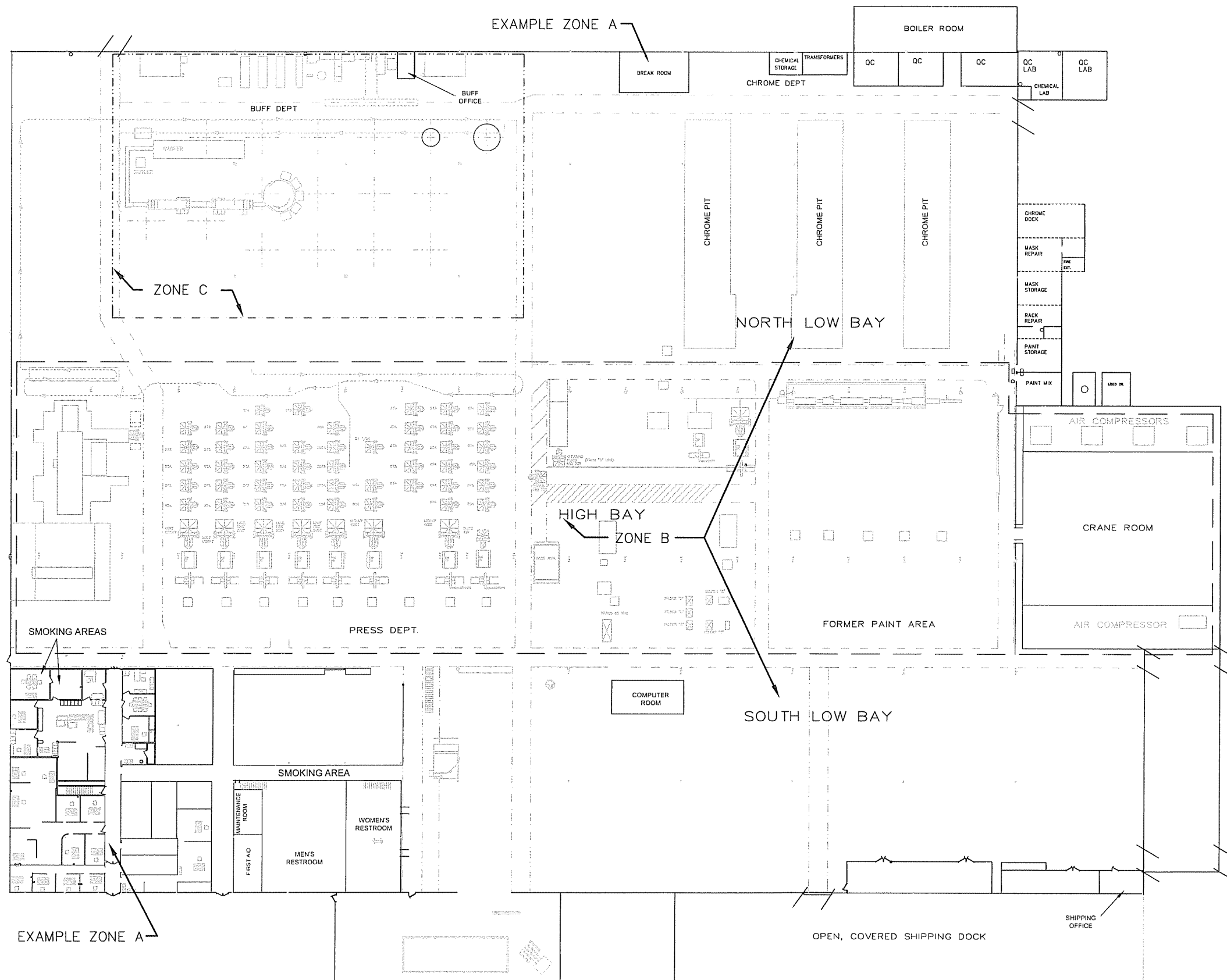
2.2 AIR HANDLING SYSTEMS USED IN MAIN PLANT BUILDING

Information about the air handling systems in the main plant building was provided by Mr. Don Williams at Grenada Manufacturing to BC via email communications and conversations. The main plant building can be divided into three general zones to describe the air handling systems:

- Zone A – Offices/Breakrooms/Restrooms,
- Zone B – Production Areas, and
- Zone C – Basement.

Figure 2-1 presents the floor plan for the main building during the February 2003 monitoring event and Figure 2-2 presents the floor plan for the main building during the August 2004 monitoring event.

In general, the Zone A rooms have independent air handling systems in the form of central air conditioning or window air conditioning units. The offices in the southwest corner of the building are cooled with a central air conditioning unit. Two smoking areas have been assigned in the office area as shown in Figure 2-1 and Figure 2-2. Although not shown on the figures, there are extra offices, storage space, and a cafeteria on a second floor in the southwest corner of the building that are cooled with the same central air conditioning system as the Zone A areas directly below. A maintenance room and first aid room, as well as the restrooms, are located adjacent to the offices on the southwest corner. As of February 2003, the aisle immediately adjacent to the men's restroom on



LEGEND

- DOOR
- ROLL UP DOOR
- HIGH BAY
- BASEMENT
- aisle way

NOTES

- SECOND FLOOR ROOMS INCLUDE OFFICE SPACE, STORAGE SPACE AND CAFETERIA BREAK ROOM. THESE ROOMS ARE LOCATED ABOVE THE OFFICES AND RESTROOMS IN THE SOUTHWEST CORNER OF THE BUILDING.
- EXAMPLES OF ZONES WITHIN BUILDING ARE SHOWN ON FIGURE. IN GENERAL THE ZONES ARE AS FOLLOWS:
 - ZONE A - OFFICES/BREAKROOMS/RESTROOMS
 - ZONE B - PRODUCTION AREAS (CONSISTING OF NORTH LOW BAY, HIGH BAY, AND SOUTH LOW BAY AREAS)
 - ZONE C - BASEMENT

FIGURE 2-1

FLOOR PLAN OF MAIN PLANT BUILDING FEBURARY 2003

GRENADA MAUFACTURING, LLC PLANT
26322.002 GRENADA, MISSISSIPPI 04/03

BROWN AND CALDWELL Nashville, Tennessee



its north wall had been designated as a smoking area (Figure 2-1); however, this area was eliminated as a smoking area at the time of the August 2004 sampling event (Figure 2-2). The new smoking area replacing the aforementioned area was designated in the room adjacent (southwest) to the women's restroom. The Paint Storage and Paint Mix rooms located along the outer eastern wall of the plant also have their own air handling system and are considered Zone A areas. The computer room and the shipping and receiving areas in the south low bay are also considered as Zone A areas. Other offices or breakrooms within the Zone A areas are cooled with window air conditioning units according to Mr. Williams. The break room on the north end of the building has been designated as a smoking area (Figure 2-1 and Figure 2-2).

The Zone B areas comprise the majority of the main plant and are referred to as the south low bay, high bay, and north low bay. At the time of the February 2003 air sampling event, two chrome pits (concrete lined) in the north low bay on the northeast end were being filled as part of closure activities. These pits were completely filled and capped with concrete floor at the time of the August 2004 event. Most of the equipment in the paint department (referred to as the former paint area in Figures 2-1 and 2-2) was removed with some items being relocated to the Buff Department on the northwest corner of the building. The bays are open without separation between sections, allowing air to flow through the area. According to Mr. Williams, there are eighteen four-foot diameter exhaust fans located in windows along the north wall of the north low bay (same as north wall of main building). There are ten four-foot diameter exhaust fans located in windows along the north wall of the high bay. During the summer (including the August 2004 event), these fans are operated continuously and other plant window and exterior roll-up doors are kept open for ventilation of Zone B. Because of heat generated by some of the production equipment (i.e., the hydraulic presses), the temperature in Zone B is regulated in cooler weather by turning off fans, closing windows, closing doors, and finally by turning on heaters. Heat is not used in Zone B until the outside temperature drops below 40°F. According to average climate data available from www.weather.com, the average high temperature for Grenada, Mississippi ranges from 51°F in January to 91°F in July; the average low temperature ranges from 29°F in January to 69°F in July. The average low temperature is below 40°F in only December, January, and February.

Zone C is the basement area (referred to as the Buff Basement), which is located in the northwest portion of the building below the Buff Department (refer to Figures 2-1 and 2-2). According to

Mr. Williams, Zone C is divided into thirteen bays which each have a blower to pull air from the floor above (Zone B) through holes in the floor and exhaust the air to the outside of the building. Operation of these blowers creates a vacuum effect at the holes in the floor in the Buff Department; buffing compound is pulled through the holes and into the basement by the vacuum during times when the basement is not occupied.

The sampling strategy included collection of representative air samples within each of the three zones. Also, based on the different ventilation scenarios, the strategy included one sampling event during a representative cold-weather month and a representative warm-weather month. As described above, during cold-weather months fans in Zone B are turned off and doors and windows are closed. As such, air flow and ventilation are significantly reduced during these periods.

2.3 WORK SPACE USAGE AND WORK SHIFT HOURS

This section describes the work space and usage for the two sampling events: February 2003 and August 2004.

2.3.1 Work Space Usage and Work Shift Hours for February 2003

According to Mr. Williams, some areas within the plant were not being used at the time of the air monitoring activities. The former chrome plating department in the northeastern portion of the plant was empty; equipment had been removed and personnel were not working in that area. At the time of the February 2003 air sampling event, the chrome pits were barricaded and in the process of being backfilled as part of closure activities; however, there was no activity during the sampling event. As mentioned previously in Section 2.2, Grenada Manufacturing ceased operations in the paint department at the end of 2002; the former paint area was located on the east side of the high bay area, as shown in Figure 2-1. Several new pits (concrete lined) had been constructed in the former paint department in preparation for new operations. At the time of the February 2003 air sampling event, the Buff Basement was filled with approximately six inches of buff compound sludge comprised mainly of water, cotton fibers, animal fats, and silica as indicated by Mr. Williams. The blowers were not operating during the February 2003 air sampling event.

Grenada Manufacturing was operating two work shifts in February 2003. The first shift was between 6:00 A.M. and 3:30 P.M.; the second shift was between 3:30 P.M. and 1:00 A.M. Because workers were working 8-hour shifts plus breaks, the sampling strategy for sample duration was to sample a representative 8-hour time period during a normal work day.

2.3.2 Work Space Usage and Work Shift Hours for August 2004

According to Mr. Williams, the facility, at the time of sampling, was running full production with minimal disruption (i.e., maintenance, repairs) for the entire week of August 16, 2004. Mr. Williams also indicated that painting with oil-based epoxy paint occurred in a room adjacent and to the north of the maintenance room and in the First Aid room located in the southwest portion of the building. The maintenance room has no air conditioning as reported. Painting began at approximately 6 A.M. and ended at 8 A.M. on August 18, 2004. The exit door adjacent to the first aid room was open to provide ventilation. Also, the former chrome pits were completely backfilled and there was no activity during the sampling event. At the time of the August 2004 air sampling event, the Buff Basement was filled with approximately four to six inches of buff compound sludge comprised mainly of water, cotton fibers, animal fats, and silica as indicated by Mr. Williams. One blower was operating on the east side of the basement area not within the area where the samples were taken during the August 2004 air sampling event.

As of August 18, 2004, Grenada Manufacturing was operating three work shifts. The first shift was between 6:00 A.M. and 2:00 P.M.; the second shift was between 2:00 P.M. and 10:00 P.M.; the third shift was between 10:00 P.M. and 6:00 A.M. Because workers are working 8-hour shifts plus breaks, and in order to have sampling results to compare to the February 2003 results, the sampling strategy for sample duration was to sample a representative 8-hour time period during a normal work day. The air sampling began at 10:00 A.M. and ended at approximately 6:35 P.M.

2.4 SUMMARY OF SAMPLING STRATEGY

Based on the information summarized above, the sampling strategy was as follows:

- Utilize a sampling and analytical method that will have detection limits below target indoor air screening concentrations;
- Collect indoor air samples from representative areas within each of the three zones within the main plant building; and
- Collect samples during one eight-hour sampling event during normal working hours and during a representative cold-weather day and a representative warm-weather day.

3.0 SAMPLING DESCRIPTION

This section of the Report describes the sampling that was conducted by BC personnel on February 17, 2003 and August 18, 2004. BC conducted the sampling in accordance with the Site Safety Plan effective January 2003 through January 2005. The sampling description below includes the qualitative indoor air survey and the indoor air sample collection and analysis for each air sampling event.

3.1 QUALITATIVE INDOOR AIR SURVEY

Prior to setting out the indoor air samplers for each event, BC field personnel met with Mr. Williams of Grenada Manufacturing to review the air sampling activities. Mr. Williams lead BC on a general walk-through of the main plant building to discuss sampling locations and current activities within the building. BC recorded the air handling systems being used at the time of the sampling (i.e., air conditioners, fans, open windows and doors, etc.). Sampling locations proposed in the Work Plan were relocated based on the walk-through. Adjustments were made as necessary and noted on the sampling map prior to start of each air sampling event. The sampling locations were moved to avoid disruption of plant operations, accidental tampering of canisters by plant personnel, or inaccessibility of locations shown in the Work Plan. Furthermore, building modifications (e.g., roof repair, chrome pits closure, etc.) and equipment relocation inside the facility were observed and noted.

During the time period that the indoor air samples were collected, a qualitative indoor air survey was performed during both air sampling events to assess the sampling conditions and to monitor the air at the sampling locations. An air monitoring instrument [a MiniRae 2000 photoionization detector (PID) with an 11.7 eV lamp] was used to survey the sampling locations to check for concentrations of VOCs during the sampling event. Because the PID had a detection limit of approximately 0.1 ppm and read total VOCs, this instrument was used as a first check of potential indoor air concentrations of VOCs and was used to assist with interpretation of the air sampling results. Time and temperature readings were also recorded at each location at the same time that PID readings were taken. A portable digital thermometer was used to record temperature readings in degrees Fahrenheit (°F).

3.2 INDOOR AIR SAMPLING PROCEDURES AND METHODS

The sample collection and analysis method used for both air sampling events was USEPA Method TO-15. Samples were collected in 6-L stainless steel summa canisters and analyzed for COCs using a gas chromatograph with a mass spectrometer (GC/MS) for the analysis.

Prior to shipment from the Columbia Analytical laboratory in Simi Valley, California, the summa canisters were cleaned and evacuated with high vacuum. The canisters were packaged in boxes and shipped to Grenada Manufacturing. A flow restrictor was supplied for each canister to allow collection of a time integrated (i.e., 8 hours) air sample over an 8-hour period. BC unpacked and prepared the canisters for sampling by attaching the flow restrictors to each of the canisters according to the manufacturer's instructions. Sample collection began once the locations had been identified and the canisters had been wrapped with caution tape, tagged with sample identification numbers, and placed in sample locations. The caution tape was used to assist in preventing tampering with the canisters. Sample collection was started by opening the valve on the flow restrictor on each canister. The start time and date for each canister and other pertinent data according to Method TO-15 were noted on the tag on each sampler and on the field sample map. Other data included in the sampling notes were PID readings, unusual odors or moving equipment that might have affected air sampling results, and temperature. At the end of the 8-hour air sampling period, the valve of each canister was closed with the time and other pertinent information noted. Each canister was checked for proper labeling prior to completion of the chain-of-custody and shipment to the laboratory.

3.3 INDOOR AIR SAMPLE COLLECTION

This section describes the sample collection for February 2003 and August 2004.

3.3.1 Indoor Air Sample Collection for February 2003

The air sample collection during the February 2003 started during the first work shift between 11:25 A.M. and 12:00 P.M. and ended eight hours later during the second shift. The maintenance office

was used as a staging area for equipment and supplies. The quality assurance/quality control (QA/QC) field blank was prepared in the maintenance office. As shown in Figure 3-1, fourteen air samples were collected from the three zones within the building: six air samples (four locations, one QA/QC co-located sample, and one field blank, A1 to A6) were collected from Zone A; six air samples (five locations and one QA/QC co-located sample, B1 to B6) were collected from Zone B; and two air samples (one location and one co-located sample, C1 and C2) were obtained from Zone C. Field QA/QC samples were collected: one co-located (i.e., replicate) sample was collected within each zone. The replicate sample for Zone A was located in the office on the southwest corner of the building. The replicate sample for Zone B was located in the former paint area, and the replicate for Zone C was located in the Buff Basement. One field blank sample, a clean canister that was not opened, was also collected. The field blank canister was removed from the packaging, labeled, and then shipped back to the laboratory for analysis along with the other canisters. Table 3-1 presents a summary of the samples collected for analysis.

Fifteen samples were originally proposed in the Work Plan; however, one sample was omitted from the Buff Basement since the area is generally left open for ventilation, and is not occupied by Grenada personnel on a daily basis for more than eight hours. Moreover, the Buff Basement area is small compared to the main facility, and is equipped with blowers (blowers were not operating during the February 2003 air sampling event) which draw air from the production floor thereby increasing air circulation in the basement and minimizing human exposure to vapors.

Laboratory QA/QC samples were prepared and analyzed as specified in Method TO-15. The MADEP guidance document includes a QA/QC checklist for indoor air quality monitoring of VOCs (see Appendix B of the Work Plan). This checklist was used to evaluate the QA/QC for this sampling and analysis, including the laboratory QA/QC such as instrument tuning, instrument calibration, matrix spike/matrix spike duplicate (MS/MSD) recoveries, and percent recoveries.

3.3.2 Indoor Air Sample Collection for August 2004

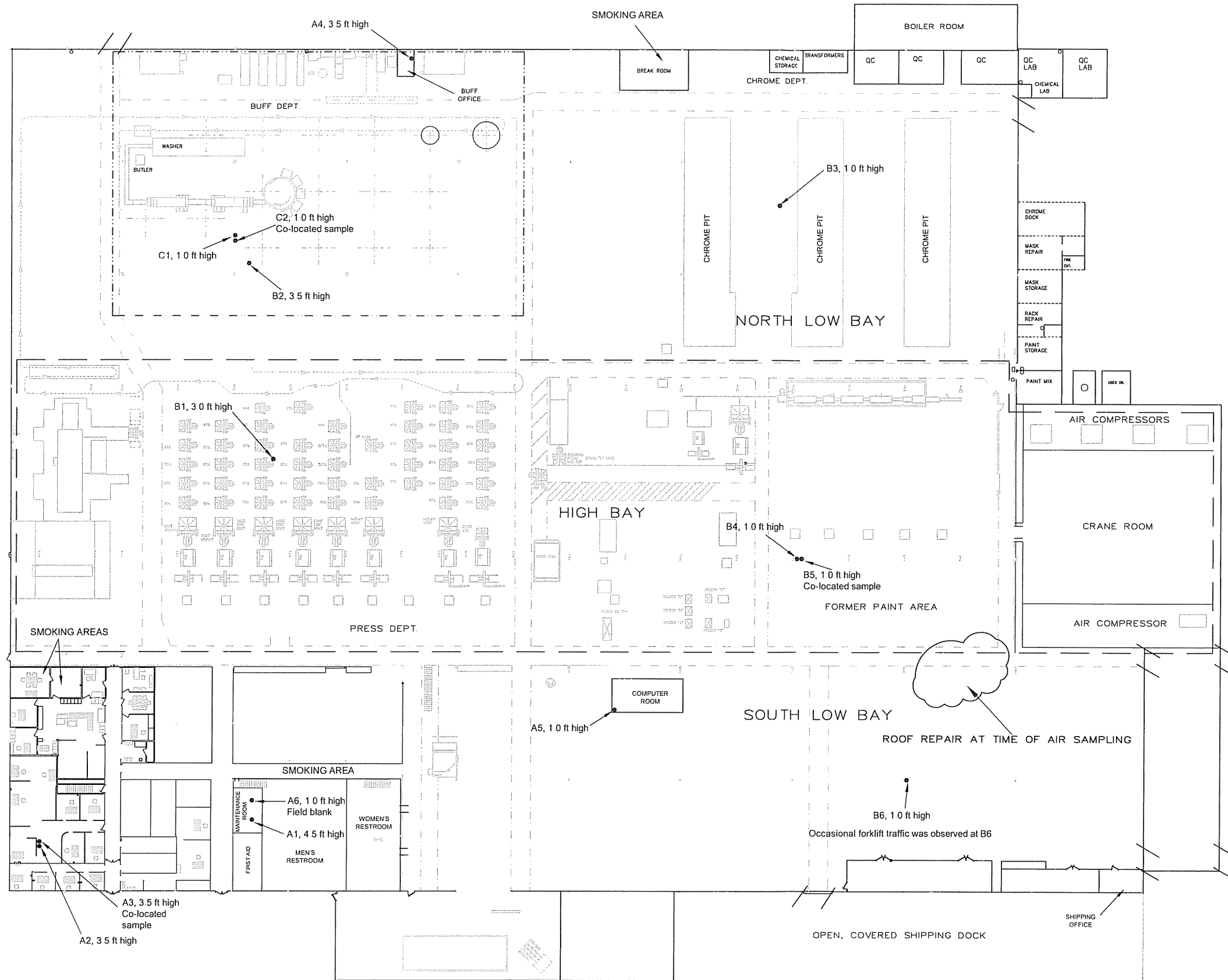
The air sample collection in August 2004 started during the first work shift between 10:00 A.M. and 10:30 P.M. and ended eight hours later during the second shift. The maintenance room was used as a staging area for equipment and supplies. The QA/QC field blank was also prepared in the

Table 3-1**Summary of Air Samples for Analysis from Main Plant Building****February 2003 and August 2004****Grenada Manufacturing Site
Grenada, Mississippi**

Sampling Area	Number of Sampling Locations ^a	Number of Co- Located Samples	Total Number of Samples in Zone
Zone A - Offices/Breakrooms/Restrooms	4	1	5
Zone B - Production Areas	5	1	6
Zone C - Basement	1	1	2
Sub-Totals:	10	3	13
Field Blank Sample ^b			1
Total Number of Samples:			14

^a See Figure 3-1 for February 2003 sampling locations; See Figure 3-2 for August 2004 sampling locations.

^b Field Blank sample was prepared in the staging area for unpacking, re-packing, and shipping of samples. The staging area was located inside the maintenance room during the February 2003 event, as shown in Figure 3-1. The staging area was located inside Mr. William's office during the August 2004 event, as shown in Figure 3.2.



LEGEND

- DOOR
- ROLL UP DOOR
- HIGH BAY
- BASEMENT
- AISLE WAY
- AIR SAMPLING LOCATION

NOTES

1. SECOND FLOOR ROOMS INCLUDE OFFICE SPACE, STORAGE SPACE AND CAFETERIA BREAK ROOM. THESE ROOMS ARE LOCATED ABOVE THE OFFICES AND RESTROOMS IN THE SOUTHWEST CORNER OF THE BUILDING
2. SAMPLE IDS CORRESPOND TO ZONE WITHIN BUILDING, I.E. ZONE A SAMPLES ARE A1, A2, ETC.

FIGURE 3-1

AIR SAMPLING LOCATIONS MAIN PLANT BUILDING FEBURARY 2003

GRENADA MAUFACTURING, LLC PLANT
26322.002 GRENADA, MISSISSIPPI 09/04

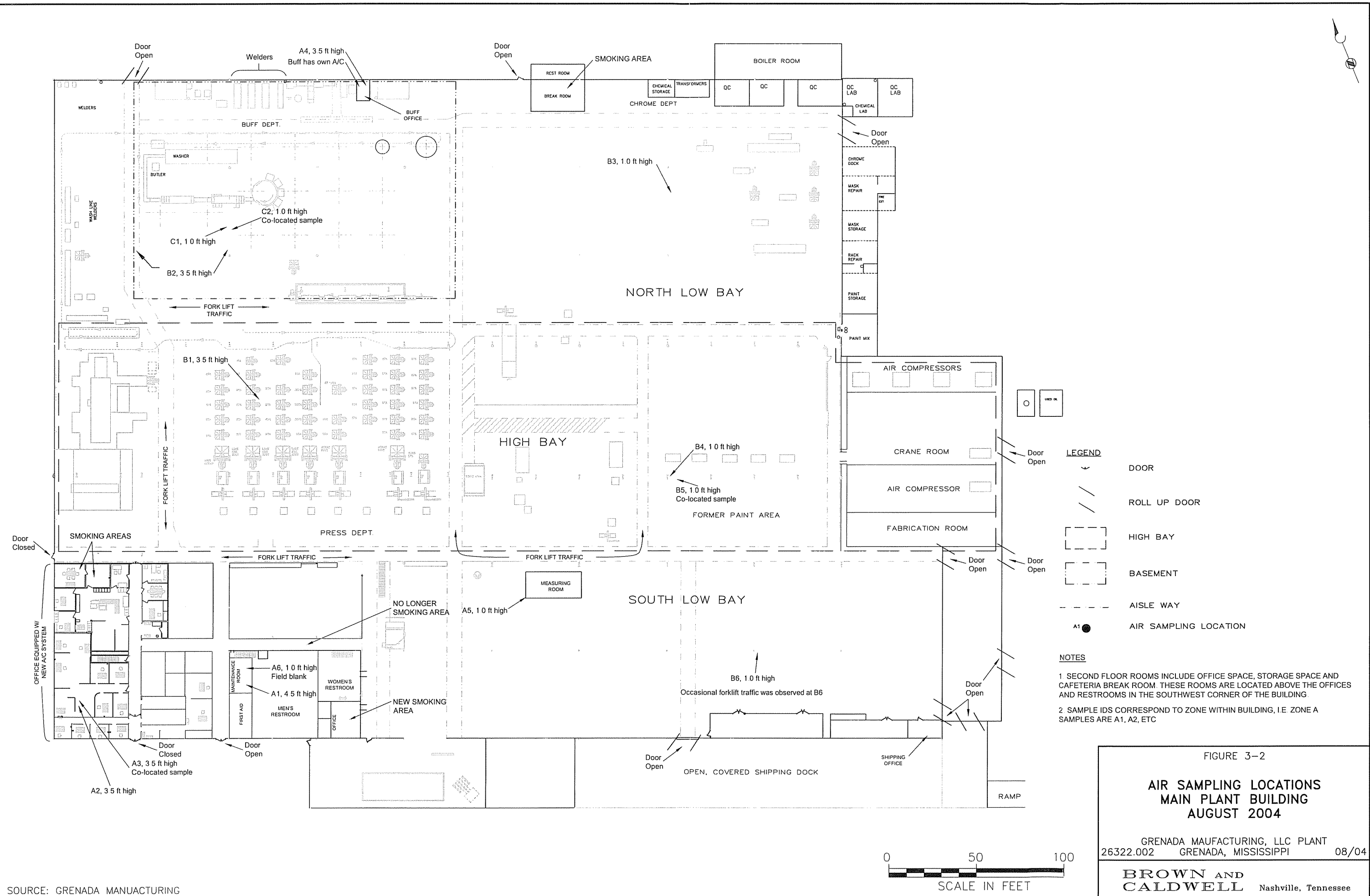
BROWN AND CALDWELL Nashville, Tennessee



maintenance room. As shown in Figure 3-2, fourteen air samples were collected from the three zones within the building: six air samples (four locations, one QA/QC co-located sample, and one field blank, A1 to A6) were collected from Zone A; six air samples (five locations and one QA/QC co-located sample, B1 to B6) were collected from Zone B; and two air samples (one location and one co-located sample, C1 and C2) were obtained from Zone C. Field QA/QC samples were collected: one co-located (i.e., replicate) sample was collected within each zone. The replicate sample for Zone A was located in the office on the southwest corner of the building. The replicate sample for Zone B was located in the former paint area, and the replicate for Zone C was located in the Buff Basement. One field blank sample, a clean canister that was not opened, was also collected. The field blank canister was removed from the packaging, labeled, and then shipped back to the laboratory for analysis along with the other canisters. Table 3-1 presents a summary of the samples collected for analysis.

Fifteen samples were originally proposed in the Work Plan; however, one sample was omitted from the Buff Basement since the area is generally left open for ventilation, and is not occupied by Grenada personnel on a daily basis for more than eight hours. Moreover, the Buff Basement area is small compared to the main facility, and is equipped with blowers (blowers were operating during the August 2004 air sampling event) which draw air from the production floor thereby increasing air circulation in the basement and minimizing human exposure to vapors.

Laboratory QA/QC samples were prepared and analyzed as specified in Method TO-15. The MADEP guidance document includes a QA/QC checklist for indoor air quality monitoring of VOCs (see Appendix B of the Work Plan). This checklist was used to evaluate the QA/QC for this sampling and analysis, including the laboratory QA/QC such as instrument tuning, instrument calibration, MS/MSD recoveries, and percent recoveries.



4.0 INDOOR AIR SAMPLING RESULTS

This section presents the indoor air sampling results.

4.1 QUALITATIVE INDOOR AIR SAMPLING RESULTS

The qualitative indoor air sampling results are presented in this section. Qualitative results include PID readings and temperature measurements.

4.1.1 Qualitative Results from the February 2003 Air Sampling Event

Figure 4-1 shows the PID and temperature readings near the sampling locations measured at two separate time intervals during the February 2003 sampling event. The PID readings were 0 ppm except for two locations during the first time interval. A PID reading of 0.9 ppm was briefly recorded near the sampling co-locations B4 and B5; a PID reading of 0.2 ppm was also recorded near the sampling location B3.

A comparison of the recorded temperatures shows that the Zone A sample locations had temperatures ranging from 67.6 °F to 68.2 °F during the first time interval (between 2 and 3 P.M.) and from 62.8 °F to 68 °F during the second time interval (between 7 and 8 P.M.). Zone A rooms were heated by central heating or by electric space heaters.

According to Mr. Williams, one of the two gas-fired heaters was operating the day of the sampling event to supply heat to Zone B. Roll-up doors in Zone B were open to the outside at various times during the sampling event. The Zone B temperatures ranged from 47.9 °F to 53.6 °F during the first time interval (between 2 and 3 P.M.) and from 49 °F to 53 °F during the second time interval (between 7 and 8 P.M.).

The temperatures for Zone C were 39 °F during the first time interval (between 2 and 3 P.M.) and 38 °F during the second time interval (between 7 and 8 P.M.). The outdoor temperature was approximately the same as the Zone C temperatures since several doors were open to the outside in Zone C and none of the exhaust fans were operating in the Buff Basement. The weather was windy

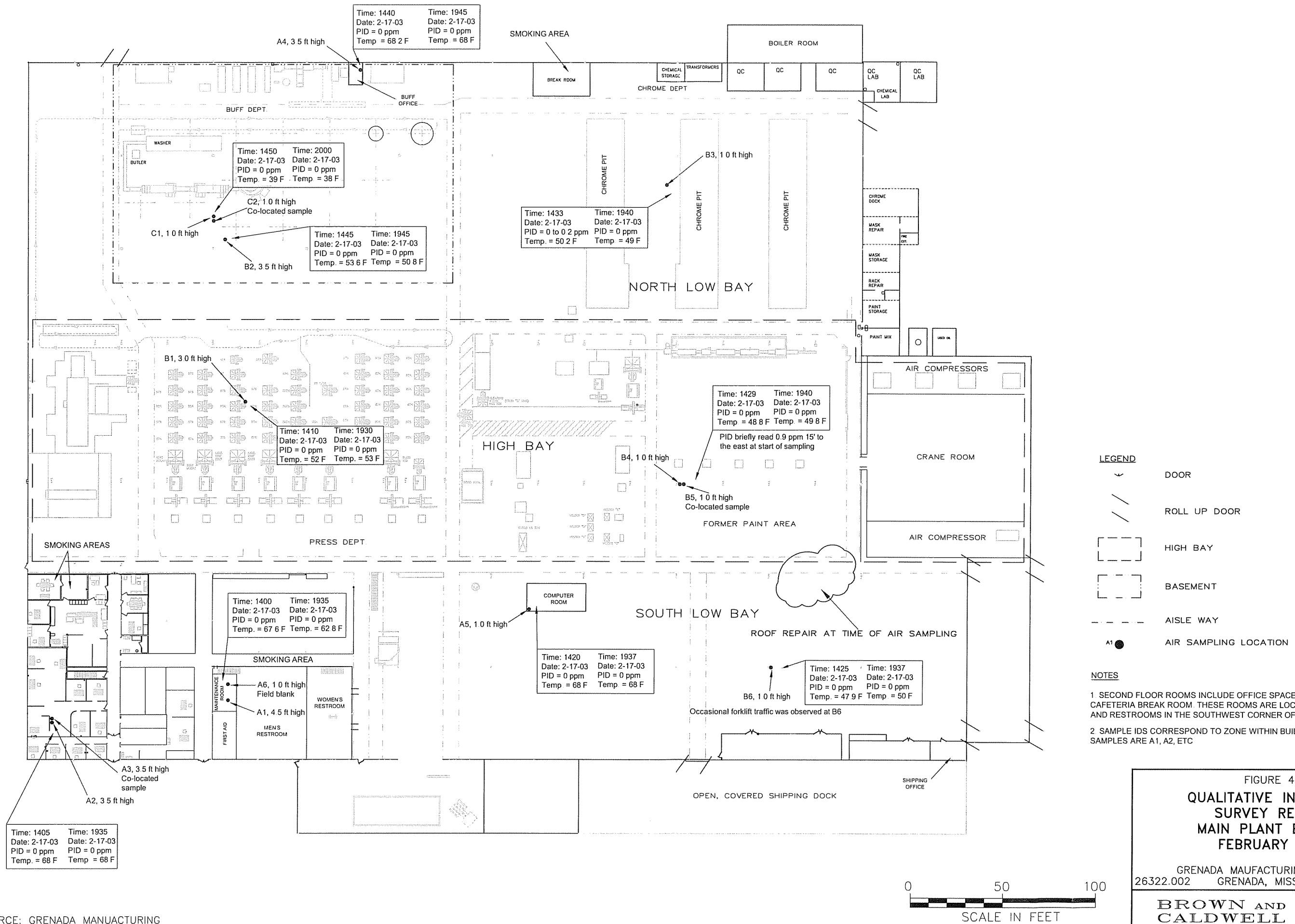


FIGURE 4-1
QUALITATIVE INDOOR AIR
SURVEY RESULTS
MAIN PLANT BUILDING
FEBRUARY 2003

GRENADA MAUFACTURING, LLC PLANT
26322.002 GRENADA, MISSISSIPPI 09/03

BROWN AND
CALDWELL Nashville, Tennessee

and overcast. According to Mr. Williams, the Buff Basement floor is generally filled with water; the source of the water is likely the process water, possibly from leaking pipes in the manufacturing area above the basement. During the sampling event, the floor of the Buff Basement was covered with approximately six inches of water and buff compound. The standing water appeared to be contained in the basement.

During the sampling activities, Grenada personnel were working within the Zone A offices and within portions of the Zone B manufacturing areas; no workers were present within Zone C, the Buff Basement. The manufacturing activities observed included operation of the buff equipment (blowers were not operating at the time of air sampling event) and washers (alkaline cleaner) in the northwest portion of the plant, operation of four drying ovens (one gas-powered and three electric-powered), operation of some of the presses in the western portion of the high bay, and finished goods storage within the south low bay using forklifts. There is one operation that uses a “naphtha” based chemical known as “varnishing oil”; however, this operation was not conducted on the day of the indoor air sampling. Mr. Williams requested that workers not use any paint or perform any maintenance activities that might add chemicals to the indoor air during the February 2003 event.

In addition, workers were removing portions of the building roof in the area shown in Figure 4-1; during a portion of the sampling period, dust and debris were observed falling from the ceiling onto the floor below. According to Mr. Williams, roof repair/replacement activities began for the main building the week prior to the sampling (i.e., February 10 through 13, 2003). The roofing activities included the use of tar-based material on the roof. Mr. Williams reported that strong tar-like odors were present throughout the building and that it was somewhat “smokey”. In an effort to diminish the impact that the chemical constituents in the tar might have on the indoor air sampling, the facility doors were opened and fans turned on to bring in fresh outdoor air on February 15 and 16. On the afternoon of February 16, the doors were closed and fans turned off as the second shift came in to work. Thus, when the sampling was conducted on February 17, the main building had been operating under normal winter air handling conditions for more than twelve hours and no tar-like odors were detected.

4.1.2 Qualitative Results from the August 2004 Air Sampling Event

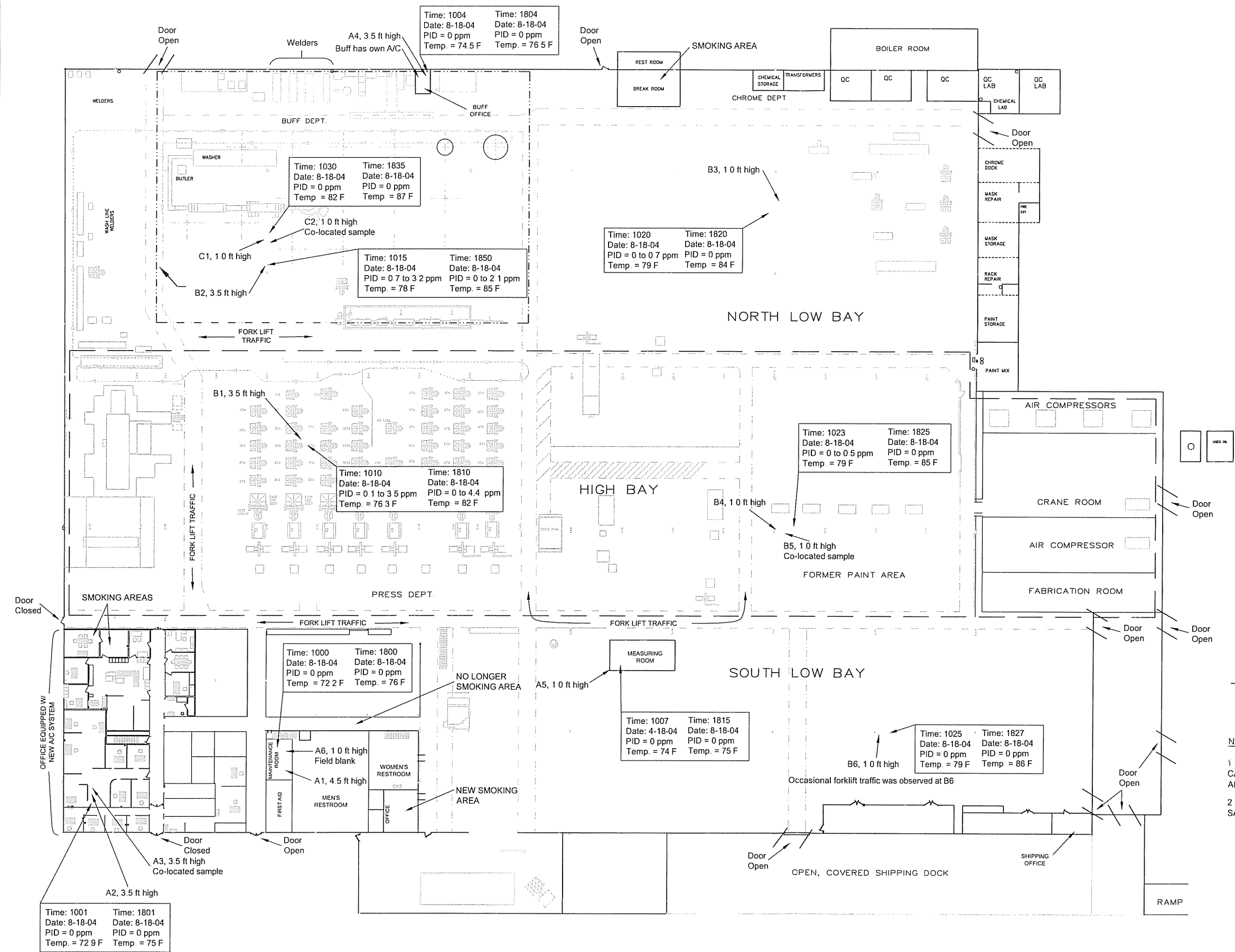
Figure 4-2 shows the PID and temperature readings near the sampling locations measured at two separate time intervals. The PID readings were 0 ppm except for four locations during the first time interval. PID readings were measured during the 8 hours between 0 and 4.4 ppm at B1; PID readings were measured between 0 and 3.2 ppm at B2. A PID reading of 0.5 ppm was briefly recorded near the sampling co-locations B4 and B5; a PID reading of 0.7 ppm was also recorded near the sampling location B3.

A comparison of the recorded temperatures shows that the Zone A sample locations had temperatures ranging from 72.2 °F to 74.5 °F at the time the canisters were opened (between 10:00 and 10:30 A.M.) and from 75.0 °F to 76.5 °F at the time the canisters were closed (between 6:00 P.M. and 6:35 P.M.). Zone A rooms were cooled by the new air conditioning system.

Roll-up doors in Zone B were open to the outside at various times during the sampling event. Zone B temperatures ranged from 76.3 °F to 79.0 °F at the time the canisters were opened (between 10:00 and 10:30 A.M.) and from 82.0 °F to 86.0 °F at the time the canisters were closed (between 6:00 and 6:35 P.M.).

The temperatures for Zone C were 82.0 °F at the time the canisters were opened (10:30 A.M.) and 87.0 °F at the time the canisters were closed (6:35 P.M.). The outdoor temperature was approximately the same as the Zone C temperatures since several doors were open to the outside in Zone C. The weather was clear. According to Mr. Williams, the Buff Basement floor is generally filled with water; the source of the water is likely the process water, possibly from leaking pipes in the manufacturing area above the basement. During the sampling event, the floor of the Buff Basement was covered with approximately four to six inches of water and buff compound. The standing water appeared to be contained in the basement.

During the sampling activities, Grenada personnel were working within the Zone A offices and within portions of the Zone B manufacturing areas; no workers were present within Zone C, the Buff Basement. The manufacturing activities observed included operation of the buff equipment (blowers were operating at the time of air sampling event) and washers (alkaline cleaner) in the northwest portion of the plant, operation of four drying ovens (one gas-powered and three electric-



- LEGEND**
- DOOR
 - ROLL UP DOOR
 - HIGH BAY
 - BASEMENT
 - aisle way
 - AIR SAMPLING LOCATION
- NOTES**
- SECOND FLOOR ROOMS INCLUDE OFFICE SPACE, STORAGE SPACE AND CAFETERIA BREAK ROOM. THESE ROOMS ARE LOCATED ABOVE THE OFFICES AND RESTROOMS IN THE SOUTHWEST CORNER OF THE BUILDING
 - SAMPLE IDS CORRESPOND TO ZONE WITHIN BUILDING, I E ZONE A SAMPLES ARE A1, A2, ETC

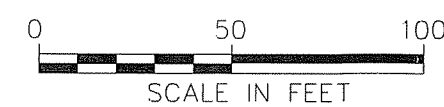


FIGURE 4-2
**MAIN PLANT BUILDING
 SURVEY RESULTS
 MAIN PLANT BUILDING
 AUGUST 2004**

GRENADA MAUFACTURING, LLC PLANT
 26322.002 GRENADA, MISSISSIPPI 08/04

**BROWN AND
 CALDWELL** Nashville, Tennessee

powered), operation of some of the presses in the western portion of the high bay, and finished goods storage within the south low bay using forklifts. Forklift traffic was observed in Zone B at the locations specified on Figure 4-2. Mr. Williams also indicated that painting occurred in a room adjacent and to the north of the maintenance room and in the First Aid room in the southwest portion of the building. The maintenance room has no air conditioning. Painting with oil-based epoxy paint began at approximately 6 A.M. and ended at 8 A.M. on August 18, 2004.

4.2 AIR SAMPLING RESULTS FOR THE COCS

This section presents a summary of the analytical sample results for the COCs.

4.2.1 February 2003 Air Sampling Results for the COCs

Table 4-1 presents the results obtained for the eleven COCs at the different locations within the three zones during the February 2003 sampling. The laboratory report with the results is included in Appendix A. Table 2a from the draft screening guidance published by the USEPA on November 29, 2002 was used for comparative purposes. However, as noted in Section 1.0, USEPA requested the use of the California EPA toxicity screening criteria for PCE and TCE; adjusted screening concentrations; the commercial/industrial scenario for the carcinogenic compounds; and Table 2b (risk = 10^{-5}) from the draft screening guidance published by the USEPA on November 29, 2002 for the non-carcinogenic compounds. Table 4-1 presents exceedances of the target indoor air screening concentrations. It also presents current Occupational Safety and Health Administration (OSHA) 8-hour time weighted average (TWA) permissible exposure limits (PELs). The OSHA PELs are included as a reference only. The air sampling results are presented according to the zone in which a sample was collected; the field QA/QC co-located samples and field blank are included in the table. The results can be summarized as follows:

- Only TCE was detected above the target indoor air screening concentrations at three locations relative to the screening concentrations for commercial/industrial scenario (B1, B2, and B3).
- Benzene, cis-1,2-dichloroethene, methylene chloride, and toluene were detected, but below their respective target indoor air screening concentrations.

Table 4-1

Summary of February 2003 Air Sampling Results

Grenada Manufacturing Site
Grenada, Mississippi

Air Sampling Results																
Zone A																
Chemical Name	CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b	OSHA 8-hour TWA PEL ^c	A1 ^d		A2		A3		A4		A5		A6	
		HI=1 (ppb _v)	Risk = 10 ⁻⁵ (ppb _v)	(ppb _v)	(ppb _v)	A1021703 ^e (ppb _v)		A2021703 (ppb _v)		A3021703 (ppb _v)		A4021703 (ppb _v)		A5021703 (ppb _v)		A6021703 (ppb _v)
Benzene	71-43-2	Naf	1.6	1,000	0.50		0.55		0.55		0.46	ND	0.51		0.31	ND
1,1-Dichloroethene	75-35-4	50	NA	NA	0.36	ND ^g	0.38	ND	0.44	ND	0.37	ND	0.37	ND	0.25	ND
1,2-Dichloroethane	107-06-2	NA	0.4	50,000	0.35	ND	0.37	ND	0.43	ND	0.37	ND	0.36	ND	0.25	ND
cis-1,2-Dichloroethene	156-59-2	8.8	NA	200,000	0.74		1.1		1.2		0.37	ND	0.73		0.25	ND
trans-1,2-Dichloroethene	156-60-5	18	NA	200,000	0.36	ND	0.38	ND	0.44	ND	0.37	ND	0.37	ND	0.25	ND
Methylene chloride	75-09-2	NA	25.4	25,000	2.1		3.7		3.8		5.2		4.5		0.29	ND
Tetrachloroethene	127-18-4	NA	1	100,000	0.21	ND	0.22	ND	0.26	ND	0.22	ND	0.22	ND	0.15	ND
Trichloroethene	79-01-6	NA	3.7	25,000	1.5		1.6		1.6		0.81		2.8		0.0093	ND
1,1,2-Trichloroethane	79-00-5	NA	0.5	10,000	0.26	ND	0.28	ND	0.32	ND	0.27	ND	0.27	ND	0.18	ND
Toluene	108-88-3	110	NA	200,000	0.94		1.4		1.3		1.1		3.0		0.27	ND
Vinyl chloride	75-01-4	NA	1.8	1,000	0.56	ND	0.59	ND	0.68	ND	0.58	ND	0.57	ND	0.39	ND

^a Target Screening Concentrations were obtained from Table 2b (10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA's Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

^d Field Desingation.

^e Laboratory Designation.

^f Not Applicable.

^g Not detected above the detection limit that is listed to the left.

Concentration exceeds screening level for risk = 10⁻⁵ from California EPA toxicity screening criteria adjusted for commercial/industrial scenario.

Co-located samples (i.e., collected in the same place).

Field Blank sample.

Table 4-1

Summary of February 2003 Air Sampling Results

Grenada Manufacturing Site
Grenada, Mississippi

Air Sampling Results															
Zone B															
Chemical Name	CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b	OSHA 8-hour TWA PEL ^c	B1		B2		B3		B4		B5		B6
		HI=1 (ppb _v)	Risk = 10 ⁻⁵ (ppb _v)												
				(ppb _v)	(ppb _v)		(ppb _v)		(ppb _v)		(ppb _v)		(ppb _v)		(ppb _v)
Benzene	71-43-2	Naf	1.6	1,000	0.50		0.54		0.51		0.44		0.61	ND	0.48
1,1-Dichloroethene	75-35-4	50	NA	NA	0.37	ND	0.33	ND	0.35	ND	0.33	ND	0.49	ND	0.38
1,2-Dichloroethane	107-06-2	NA	0.4	50,000	0.36	ND	0.32	ND	0.34	ND	0.32	ND	0.48	ND	0.38
cis-1,2-Dichloroethene	156-59-2	8.8	NA	200,000	2.3		0.86		0.60		0.78		0.84		0.62
trans-1,2-Dichloroethene	156-60-5	18	NA	200,000	0.37	ND	0.33	ND	0.35	ND	0.33	ND	0.49	ND	0.38
Methylene chloride	75-09-2	NA	25.4	25,000	10		9.0		13		5.7		5.7		3.8
Tetrachloroethene	127-18-4	NA	1	100,000	0.22	ND	0.19	ND	0.21	ND	0.19	ND	0.29	ND	0.22
Trichloroethene	79-01-6	NA	3.7	25,000	7.9		3.7		4.5		3.1		3.2		2.0
1,1,2-Trichloroethane	79-00-5	NA	0.5	10,000	0.27	ND	0.24	ND	0.25	ND	0.24	ND	0.36	ND	0.28
Toluene	108-88-3	110	NA	200,000	1.7		2.8		1.9		1.1		1.2		1.1
Vinyl chloride	75-01-4	NA	1.8	1,000	0.58	ND	0.51	ND	0.54	ND	0.50	ND	0.77	ND	0.59

^a Target Screening Concentrations were obtained from Table 2b (10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA's Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

^d Field Designation.

^e Laboratory Designation.

^f Not Applicable.

^g Not detected above the detection limit that is listed to the left.

Concentration exceeds screening level for risk = 10⁻⁵ from California EPA toxicity screening criteria adjusted for commercial/industrial scenario.

Co-located samples (i.e., collected in the same place).

Field Blank sample.

Table 4-1

Summary of February 2003 Air Sampling Results

Grenada Manufacturing Site
Grenada, Mississippi

Air Sampling Results								
Zone C								
Chemical Name	CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b	OSHA 8-hour TWA PEL ^c				
		HI=1 (ppb _v)	Risk = 10 ⁻⁵ (ppb _v)		C1 C1021703 (ppb _v)	C2 C2021703 (ppb _v)		
Benzene	71-43-2	Naf	1.6	1,000	0.44	ND	0.39	ND
1,1-Dichloroethene	75-35-4	50	NA	NA	0.36	ND	0.32	ND
1,2-Dichloroethane	107-06-2	NA	0.4	50,000	0.35	ND	0.31	ND
cis-1,2-Dichloroethene	156-59-2	8.8	NA	200,000	0.36	ND	0.32	ND
trans-1,2-Dichloroethene	156-60-5	18	NA	200,000	0.36	ND	0.32	ND
Methylene chloride	75-09-2	NA	25.4	25,000	0.41	ND	0.36	ND
Tetrachloroethene	127-18-4	NA	1	100,000	0.21	ND	0.18	ND
Trichloroethene	79-01-6	NA	3.7	25,000	0.20		0.17	
1,1,2-Trichloroethane	79-00-5	NA	0.5	10,000	0.26	ND	0.23	ND
Toluene	108-88-3	110	NA	200,000	0.38	ND	0.33	ND
Vinyl chloride	75-01-4	NA	1.8	1,000	0.56	ND	0.49	ND

^a Target Screening Concentrations were obtained from Table 2b
(10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document
published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA's
Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California
EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

^d Field Desingation.

^e Laboratory Designation.

^f Not Applicable.

^g Not detected above the detection limit that is listed to the left.

Concentration exceeds screening level for risk = 10⁻⁵ from California EPA toxicity
screening criteria adjusted for commercial/industrial scenario.

Co-located samples (i.e., collected in the same place).

Field Blank sample.

- One COC, 1,2-dichloroethane was not detected, but in two samples (A3 and B5), the detection limits were slightly above their respective target indoor air screening concentrations.
- Four COCs, 1,1-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene, and vinyl chloride were not detected and detection limits were below their respective target indoor air screening concentrations.

Field QA/QC sample results can be summarized as follows:

- Co-located samples in each of the building zones had results that were quite close. For example, TCE results for co-located samples were 1.6 and 1.6 ppb_v in Zone A; 3.1 and 3.2 ppb_v in Zone B; and 0.20 and 0.17 ppb_v in Zone C.
- The field blank sample had no detectable concentrations of any of the COCs.

The laboratory QA/QC results and a copy of the chain-of-custody form are presented in Appendix A along with the sample results. The results for the three laboratory method blanks were non-detect for the COCs. The percent recovery for the spiked compounds in the laboratory control samples (LCSs) were within the acceptance criteria for the analytical method.

4.2.2 August 2004 Air Sampling Results for the COCs

Table 4-2 presents the results obtained for the eleven COCs at the different locations within the three zones during the August 2004 sampling. The laboratory report with the results is included in Appendix B. For comparative purposes, Table 4-2 presents target indoor air screening concentrations; see Section 2.1 for an explanation of the origin of these concentrations. Table 4-2 also presents exceedances of the target indoor air screening concentrations. The current OSHA 8-hour TWA PELs are also presented in Table 4-2 for comparison only. The air sampling results

are presented according to the zone in which a sample was collected; the field QA/QC co-located samples and field blank are included in the table.

The results can be summarized as follows:

- Only TCE and methylene chloride were detected above their respective target indoor air screening concentrations. TCE only exceeded at one location (B3); methylene chloride exceeded at two locations (B1 and B2).
- Benzene, 1,1-dichloroethene, 1,2-dichloroethane, cis-1,2-dichloroethene, tetrachloroethene, and toluene were detected, but below their respective target indoor air screening concentrations.
- Three COCs, trans-1,2-dichloroethene, 1,1,2-trichloroethane, and vinyl chloride, were not detected and detection limits were below their respective target indoor air screening concentrations.

Field QA/QC sample results can be summarized as follows:

- Co-located samples in each of the building zones had results that were quite close. For example, TCE results for co-located samples were 0.17 and 0.15 ppb_v in Zone A; 1.4 and 1.5 ppb_v in Zone B; and 1.3 ppb_v (for both samples) in Zone C.
- The field blank sample had a detection of methylene chloride (0.031 ppb_v), which was slightly above the method reporting limit of 0.029 ppb_v; there were no other COCs detected in the field blank.

The laboratory QA/QC results and a copy of the chain-of-custody form are presented in Appendix B along with the sample results. The results for the two laboratory method blanks were non-detect for the COCs. The percent recovery for the spiked compounds in the laboratory control samples (LCSs) were within the acceptance criteria for the analytical method.

Table 4-2
Summary of August 2004 Air Sampling Results

Grenada Manufacturing Site
Grenada, Mississippi

Air Sampling Results															
Target Indoor Air Screening Concentration										Zone A					
CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b	OSHA 8-hour TWA PEL ^c	A1 ^d		A2		A3		A4		A5		A6	
	HI=1	Risk = 10 ⁻⁵		A1081805 ^e		A2081805		A3081805		A4081805		A5081805		A6081805	
	Chemical Name	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)		(ppb _v)		(ppb _v)		(ppb _v)		(ppb _v)		(ppb _v)
Benzene	71-43-2	NA ^f	1.6	1,000	0.17		0.58		0.25		0.20		0.24	0.031	ND
1,1-Dichloroethene	75-35-4	50	NA	NA	0.019	ND ^g	0.018	ND	0.019	ND	0.021	ND	0.019	ND	0.0063
1,2-Dichloroethane	107-06-2	NA	0.4	50,000	0.019	ND	0.084		0.019	ND	0.020	ND	0.019	ND	0.0062
cis-1,2-Dichloroethene	156-59-2	8.8	NA	200,000	0.11		0.14		0.14		0.51		0.34	0.0063	ND
trans-1,2-Dichloroethene	156-60-5	18	NA	200,000	0.019	ND	0.018	ND	0.019	ND	0.021	ND	0.019	ND	0.0063
Methylene chloride	75-09-2	NA	25.4	25,000	0.11		8.5		6.7		5.9		1.4	0.031	
Tetrachloroethene	127-18-4	NA	1	100,000	0.018		0.061		0.061		0.023		0.040	0.0037	ND
Trichloroethene	79-01-6	NA	3.7	25,000	0.12		0.17		0.16		1.3		0.62	0.0047	ND
1,1,2-Trichloroethane	79-00-5	NA	0.5	10,000	0.014	ND	0.013	ND	0.014	ND	0.015	ND	0.014	ND	0.0046
Toluene	108-88-3	110	NA	200,000	3.80		4.2		3.2		2.2		0.98	0.027	ND
Vinyl chloride	75-01-4	NA	1.8	1,000	0.030	ND	0.028	ND	0.030	ND	0.032	ND	0.030	ND	0.0098

^a Target Screening Concentrations were obtained from Table 2b (10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA's Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

^d Field Designation.

^e Laboratory Designation.

^f Not Applicable.

^g Not detected above the detection limit that is listed to the left.

Concentration exceeds screening level for risk = 10⁻⁵ from California EPA toxicity screening criteria adjusted for commercial/industrial scenario.

Co-located samples (i.e., collected in the same place).

Field Blank sample.

Table 4-2
Summary of August 2004 Air Sampling Results

Grenada Manufacturing Site
Grenada, Mississippi

Air Sampling Results																
Target Indoor Air Screening Concentration					Zone B											
CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b	OSHA 8-hour TWA PEL ^c	B1		B2		B3		B4		B5		B6		
	HI=1	Risk = 10 ⁻⁵		B1081805		B2081805		B3081805		B4081805		B5081805		B6081805		
	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)	(ppb _v)			
Chemical Name																
Benzene	71-43-2	NA ^f	1.6	1,000	0.18		0.21		0.17		0.16		0.16		0.15	
1,1-Dichloroethene	75-35-4	50	NA	NA	0.018	ND	0.022	ND	0.036		0.024	ND	0.022	ND	0.018	
1,2-Dichloroethane	107-06-2	NA	0.4	50,000	0.018	ND	0.021	ND	0.026	ND	0.023	ND	0.021	ND	0.018	
cis-1,2-Dichloroethene	156-59-2	8.8	NA	200,000	0.24		0.46		1.5		0.77		0.81		0.27	
trans-1,2-Dichloroethene	156-60-5	18	NA	200,000	0.018	ND	0.022	ND	0.026	ND	0.024	ND	0.022	ND	0.018	
Methylene chloride	75-09-2	NA	25.4	25,000	69		31		0.43		0.11	ND	0.13		0.084	
Tetrachloroethene	127-18-4	NA	1	100,000	0.053		0.11		0.045		0.017		0.020		0.016	
Trichloroethene	79-01-6	NA	3.7	25,000	0.48		0.95		8.1		1.4		1.5		0.60	
1,1,2-Trichloroethane	79-00-5	NA	0.5	10,000	0.013	ND	0.016	ND	0.019	ND	0.017	ND	0.016	ND	0.013	
Toluene	108-88-3	110	NA	200,000	0.68		1.2		1.2		0.62		0.78		0.93	
Vinyl chloride	75-01-4	NA	1.8	1,000	0.029	ND	0.034	ND	0.041	ND	0.037	ND	0.034	ND	0.029	

^a Target Screening Concentrations were obtained from Table 2b (10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA's Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

^d Field Desingation.

^e Laboratory Designation.

^f Not Applicable.

^g Not detected above the detection limit that is listed to the left.

Concentration exceeds screening level for risk = 10⁻⁵ from California EPA toxicity screening criteria adjusted for commercial/industrial scenario.

Co-located samples (i.e., collected in the same place).

Field Blank sample.

Table 4-2
Summary of August 2004 Air Sampling Results

Grenada Manufacturing Site
Grenada, Mississippi

Air Sampling Results									
		Target Indoor Air Screening Concentration				Zone C			
	CAS Number	Target Indoor Air Screening Concentration for Non-Carcinogens ^a	Target Indoor Air Screening Concentrations for Carcinogens ^b	OSHA 8-hour TWA PEL ^c	C1		C2		
Chemical Name		HI=1 (ppb _v)	Risk = 10 ⁻⁵ (ppb _v)	(ppb _v)	C1081805 (ppb _v)		C2081805 (ppb _v)		
Benzene	71-43-2	NA ^f	1.6	1,000	0.21		0.19		
1,1-Dichloroethene	75-35-4	50	NA	NA	0.019	ND	0.020	ND	
1,2-Dichloroethane	107-06-2	NA	0.4	50,000	0.019	ND	0.019	ND	
cis-1,2-Dichloroethene	156-59-2	8.8	NA	200,000	0.47		0.48		
trans-1,2-Dichloroethene	156-60-5	18	NA	200,000	0.019	ND	0.020	ND	
Methylene chloride	75-09-2	NA	25.4	25,000	5.7		5.9		
Tetrachloroethene	127-18-4	NA	1	100,000	0.018		0.019		
Trichloroethene	79-01-6	NA	3.7	25,000	1.3		1.3		
1,1,2-Trichloroethane	79-00-5	NA	0.5	10,000	0.014	ND	0.014	ND	
Toluene	108-88-3	110	NA	200,000	0.92		0.42		
Vinyl chloride	75-01-4	NA	1.8	1,000	0.030	ND	0.031	ND	

^a Target Screening Concentrations were obtained from Table 2b (10⁻⁵ risk) of the Draft Vapor Intrusion Guidance Document published by the USEPA on November 29, 2002.

^b Concentrations are adjusted for industrial exposure scenario as obtained from a USEPA's Office of Technical Services (OTS) memorandum dated June 16, 2003.

^c Concentration is adjusted for industrial use scenario found originally from California EPA Toxicity Screening Criteria. See USEPA OTS memorandum dated June 16, 2003.

^d Field Designation.

^e Laboratory Designation.

^f Not Applicable.

^g Not detected above the detection limit that is listed to the left.

Concentration exceeds screening level for risk = 10⁻⁵ from California EPA toxicity screening criteria adjusted for commercial/industrial scenario.

Co-located samples (i.e., collected in the same place).

Field Blank sample.

4.3 EVALUATION OF AIR SAMPLING RESULTS

This section presents an evaluation of the qualitative and quantitative results for the two sampling events.

4.3.1 Evaluation of February 2003 Results

Of the eleven COCs, only five were detected above very low method detection limits. Of the five COCs that were detected, only TCE was detected at or above its target indoor air screening concentration (i.e., 3.7 ppb_v) at three locations (3.7 ppb_v at B2, 4.5 ppb_v at B3, and 7.9 ppb_v at B1). These exceedances are only slightly above the screening concentrations, less than an order of magnitude different. Overall, the TCE concentrations ranged from 0.17 to 7.9 ppb_v. While these results are above the target indoor air screening concentration, they are approximately 3,000 to 6,000 times lower than the OSHA 8-hour TWA PELs.

The February 2003 indoor air samples were collected during winter conditions, presumably the “worst case” scenario since there is the least ventilation or movement of air through the plant at that time. It is reasonable to expect that the concentrations of COCs in indoor air would be lower during the majority of the year when Grenada Manufacturing has doors and windows open and fans operating to cool and move air through the building.

4.3.2 Evaluation of August 2004 Results

Of the eleven COCs, eight were detected above very low method detection limits. Of the eight COCs that were detected, only TCE and methylene chloride were detected above their respective target indoor air screening concentrations. The TCE concentrations ranged from 0.12 to 8.1 ppb_v with one sample (B3) above the target indoor air screening concentration (i.e., 3.7 ppb_v). These exceedances are only slightly above the screening concentration, less than an order of magnitude different. The methylene chloride concentrations ranged from 0.11 to 69 ppb_v with two samples (B1 and B2) above the target air screening concentration (i.e., 25 ppb_v). These exceedances are only slightly above the screening concentration, less than an order of magnitude in different. The QA/QC field blank had methylene chloride detected at 0.031 ppb_v. While these results are above

the target indoor air screening concentration, they are approximately 300 to 3,000 times lower than the OSHA 8-hour TWA PELs.

5.0 CONCLUSIONS

Based on the information presented in this report, the following conclusions can be made:

- The sampling strategy described in the Work Plan was successfully implemented:
 - A sampling and analytical method was utilized that had detection limits below target indoor air screening concentrations, to the extent practicable;
 - Indoor air samples were collected from representative areas within each of the three zones within the main plant building; and
 - Indoor air samples were collected during one eight-hour sampling event during normal working hours and during a representative cold-weather day and a warm-weather day.
- The sampling results are consistent within work zones, field QA/QC co-located sample results are in good agreement, and the field QA/QC sample results show no detectable concentrations of the COCs in the field blank. Although methylene chloride was detected in the field blank during the August sampling event, methylene chloride was also detected in two of the samples.
- Ten of the eleven COCs reported were either below their target indoor air screening concentration or below their detection limit for the February 2003 event. Nine of the eleven COCs reported were either below their target indoor air screening concentration or below their detection limit for the August 2004 event. Only TCE was detected above its target indoor air screening concentration for both events; however, the detected concentrations were still well below the OSHA 8-hour TWA PEL (i.e., 25,000 ppb_v). Methylene chloride was only detected at two locations above its target indoor air screening concentration, and only during the August 2004 event.
- No further sampling is warranted based on these indoor air sample results because the February 2003 air sampling event was conducted under presumably worst-case scenario

conditions (i.e., cold temperatures, limited ventilation, Buff Basement blowers not operating) and the results of the August 2004 sampling event generally support this conclusion.

- The air sampling results should be considered in the Design of Corrective Measures for the Site.

APPENDIX A

**USEPA OTS MEMORANDUM DATED
JUNE 16, 2003 AND MAY 17, 2004**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

June 16, 2003

4WD-OTS

MEMORANDUM

SUBJECT: Review of the draft Indoor Air Monitoring Report for the Grenada Manufacturing Site

FROM: Janine Dinan, Environmental Health Scientist
Office of Technical Services
Waste Management Division

THRU: Elmer W. Akin, Chief
Office of Technical Services
Waste Management Division

TO: Donald Webster
RCRA Programs Branch

Per your request, I have reviewed the draft **Indoor Air Monitoring Report for the Grenada Manufacturing Site in Grenada, Mississippi.**

Several months ago, I reviewed the workplan and I am surprised to see that instead of screening at a 10-5 risk for carcinogenic chemicals, as was proposed in the workplan, Grenada Manufacturing is comparing their monitoring results to either OSHA PELs or a 10-4 risk level. It is my understanding that the chemicals of concern from a vapor intrusion standpoint are not used in the current manufacturing processes at the facility. Therefore, OSHA PELs are not relevant to this situation. In addition, please be aware that comparing the monitoring results directly to a 10-4 risk level does not address the risk of exposure to the multiple chemicals detected in the indoor air samples.

SPECIFIC COMMENTS:

I suggest some revisions to Table 2-1 of the report. I agree with Grenada Manufacturing that the Target Indoor Air Concentrations presented in EPA's draft Vapor Intrusion Guidance (dated November 20, 2002) were derived using residential land use assumptions. For carcinogenic chemicals, the guidance derives target values using exposure assumptions of 350 days per year for 30 years. I agree that it is more appropriate for this site to use the exposure assumptions of 250 days per year for 25 years for the carcinogenic chemicals. The same adjustment, however, can not be applied to the Reference Concentrations (RfCs) for noncarcinogenic chemicals. Therefore, the RfC is used directly as the target concentration for indoor air. Please note that the hours per day of exposure are not adjusted. Inhalation rate determines the exposure, and the inhalation rate assumptions are the same for the residential and commercial/industrial settings.

I propose two chemical-specific changes to the table. Very recently, EPA's Office of Solid Waste and Emergency Response (OSWER) has adopted California EPA's toxicity criteria for Tetrachloroethylene (PCE). The new inhalation unit risk value is $5.9\text{E-}06$ (ug/cu.m)⁻¹. Trichloroethylene (TCE) is another chemical where the toxicity criteria is likely to change. The inhalation unit risk value presented in the draft Vapor Intrusion Guidance [$1.1\text{E-}04$ (ug/cu.m)⁻¹] is under review within EPA and is slated to undergo review by the National Academy of Sciences. I suggest using California EPA's value of $2\text{E-}06$ (ug/cu.m)⁻¹, as California EPA values are part of OSWER's hierarchy of toxicity databases.

In accordance with the draft Vapor Intrusion Guidance, I suggest screening the air monitoring results based on a 10-5 risk for exposure to carcinogenic contaminants in the commercial/industrial setting, using the following values:

Benzene	5.2 ug/cu.m (1.6 ppbv)
1,2-Dichloroethane	1.6 ug/cu.m (0.4 ppbv)
Methylene Chloride	88 ug/cu.m (25.4 ppbv)
PCE	6.9 ug/cu.m (1 ppbv)
TCE	20 ug/cu.m (3.7 ppbv)
1,1,2-TCA	2.6 ug/cu.m (0.5 ppbv)
Vinyl Chloride	4.6 ug/cu.m (1.8 ppbv)

A comparison of the air monitoring results to these values showed TCE as the only chemical to exceed its risk based target. However, the highest TCE value detected (7.9 ppbv in Zone B) corresponds to a 10-5 risk based on the current California EPA inhalation unit risk value.

Although the current monitoring results do not exceed risk-

based target levels, there are a number of issues to be aware of at the site.

- 1) These data are from one sampling event. It is my understanding that the groundwater levels at the site fluctuate considerably throughout the year. Therefore, there is significant uncertainty regarding whether these data represent the "worst case."
- 2) Has the plume beneath the building reached steady state? In other words, are the levels of TCE and other contaminants upgradient of the building lower than what has reached the building to date? If not, future sampling rounds should be conducted.
- 3) Toxicity criteria change. For example, the TCE criterion is currently under review, but the value currently proposed by the Agency [$1.1 \text{ E-04 (ug/cu.m)}^{-1}$] may be adopted. In that case, the current monitoring results would fall outside EPA's risk range, and remedial action may be warranted.

If you should have any questions please feel free to contact me at 2-8491.

REFERENCES:

USEPA 2002. Vapor Intrusion Guidance. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington DC. EPA. Draft. November 2002.

USEPA 2003. Toxicity Criteria for Tetrachloroethylene. OSWER Directive 9285.7-74. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. April, 25, 2003.

cc: Elmer Akin, Chief, Office of Technical Services

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 17 2004

4WD-RPB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Don Williams, Plant Environmental Coordinator
Grenada Manufacturing, LLC
635 Highway 332
Grenada, Mississippi 38901

SUB: Draft Indoor Air Monitoring Report dated April 2003
Grenada Manufacturing, LLC
EPA ID No. MSD 007 037 278

Dear Mr. Williams;

In February 2003, Grenada conducted indoor air sampling for eleven volatile organic compounds found in the TCE and Toluene plume located under the northwest corner of the Main Plant Building. On April 16, 2003, Grenada summarized the results of this sampling in a report to EPA. This report was reviewed by EPA's Office of Technical Services, which made the attached comments on June 16, 2003.

This Vapor Intrusion Assessment was necessary to answer the question of whether or not there is a completed pathway for human exposure to volatile organic compounds (VOCs) from the contaminant plume. This information will be necessary in order to conduct an Environmental Indicator Assessment of the Grenada Manufacturing facility now that Grenada is part of the Year 2008 GPRA Universe [Government Performance and Results Act].

Overall, the indoor air monitoring was conducted in accordance with the workplan previously furnished to EPA. Grenada's contractor, Brown and Caldwell, found that ten of the eleven Constituents of Concern [COCs] were either below their target indoor air screening concentrations or below their detection limit. TCE was detected in some samples above its target indoor air screening level. The highest level of TCE detected corresponds to a 10-5 risk level based on the current California EPA inhalation unit risk value.

EPA does not agree with the facility's conclusion that no further sampling is necessary. Although Grenada selected a presumably worst-case scenario [i.e., cold temperatures, limited ventilation, Buff Basement blowers not operating], EPA is not convinced that this truly represents a worst-case event. Groundwater level fluctuates greatly at the site, summer temperatures are high and portions of the building have limited ventilation also in summer. Therefore, EPA is

-2-

requiring Grenada to repeat the sampling event in Summer 2004 according to the workplan and methodology approved by EPA and used in the previous sampling in February 2003. The facility must address the general concerns and specific comments expressed by the Office of Technical Services in its Memo dated June 16, 2003 before it begins sampling or in the Final Indoor Air Monitoring Report, as appropriate.

If you have any questions or concerns regarding this letter, please contact Mr. Don Webster, your EPA Project Manager, at (404) 563-8469

Sincerely,

A handwritten signature in black ink, appearing to read "Jon D. Johnston", with a stylized flourish at the end.

Jon D. Johnston
Chief, RCRA Programs Branch
Waste Management Division

Attachment

cc: Toby Cook, MDEQ
John Devic, Textron Automotive
John Bozick, Arvin Meritor Automotive

APPENDIX B

**ANALYTICAL LABORATORY RESULTS
FOR INDOOR AIR SAMPLES
FEBRUARY 2003**

Client:	BROWN AND CALDWELL	Date of Report:	03/13/03
Address:	501 Great Circle Road, Suite 150	Date Received:	02/20/03
	Nashville, TN 37228	CAS Project No:	P2300280
Contact:	Mr. Jimmy How	Purchase Order:	23858.001

Client Project ID: Grenada Indoor Air Sampling / 23858.001

Fourteen (14) Stainless Steel Summa Canisters labeled:

"A1021703"	"A2021703"	"A3021703"	"A4021703"	"A5021703"
"A6021703"	"B1021703"	"B2021703"	"B3021703"	"B4021703"
"B5021703"	"B6021703"	"C1021703"	"C2021703"	

The samples were received at the laboratory under chain of custody on February 20, 2003. The samples were received intact. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time that they were received at the laboratory.

Trichloroethene Analysis

Three of the samples were analyzed by combined gas chromatography/mass spectrometry (GC/MS) in SIM mode for trichloroethene. The analyses were performed according to the methodology outlined in EPA Method TO-15. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Agilent Model 5973N GC/MS/DS interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

Reviewed and Approved:



Svetlana Walsh
Analytical Chemist
Air Quality Laboratory

Reviewed and Approved:



Chris Parnell
GCMS-VOA Team Leader
Air Quality Laboratory

Page
1 of 235



CAS Project No: P2300280

Volatile Organic Compound Analysis

All of the samples were analyzed by combined gas chromatography/mass spectrometry (GC/MS) for volatile organic compounds. The analyses were performed according to the methodology outlined in EPA Method TO-15. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Hewlett Packard Model 5973 GC/MS/DS interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

The results of analyses are given in the attached data package. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Columbia Analytical Services, Inc.

Sample Acceptance Check Form

Client: Brown and Caldwell

Work order: P2300280

Project: Grenada Indoor Air Sampling/23858.001

Sample(s) received on: 2/20/03

Date opened: 2/20/03

by SM

Note: This form is used for all samples received by PAI. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client or as required by the method/SOP.

		<u>Yes</u>	<u>No</u>	<u>N/A</u>
1	Were custody seals on outside of cooler/Box?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Location of seal(s)? _____ Sealing Lid?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were signature and date included?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were custody seals on outside of sample container?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Location of seal(s)? _____ Sealing Lid?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were signature and date included?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Were sample containers marked with client sample ID?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Did sample containers arrive in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Were chain-of-custody papers used and filled out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Did sample container labels and/or tags agree with custody papers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Was sample volume received adequate for analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Are samples within specified holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Was proper temperature (thermal preservation) of cooler at receipt adhered to?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Cooler Temperature NA °C			
	Blank Temperature NA °C			
9	Is pH (acid) preservation necessary, according to method/SOP or Client specified information?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Is there a client indication that the submitted samples are pH (acid) preserved?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were VOA vials checked for presence/absence of air bubbles?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Lab Sample ID	Required pH	pH (as received, if required)	VOA Headspace (Presence/Absence)
P2300280-001			NA
P2300280-002			NA
P2300280-003			NA
P2300280-004			NA
P2300280-005			NA
P2300280-006			NA
P2300280-007			NA
P2300280-008			NA
P2300280-009			NA
P2300280-010			NA
P2300280-011			NA
P2300280-012			NA

Explain any discrepancies: (include lab sample ID numbers):

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Brown and Caldwell Work order: P2300280
Project: Grenada Indoor Air Sampling/23858.001
Sample(s) received on: 2/20/03 Date opened: 2/20/03 by SM

Lab Sample ID	Required pH	pH (as received, if required)	VOA Headspace (Presence/Absence)
P2300280-013			NA
P2300280-014			NA
P2300280-015			NA

RESULTS OF VOLATILE ORGANIC ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280

Trichloroethene

Test Code: EPA TO-15 (SIM)
Instrument ID: Agilent 5973N/Tekmar AUTOCan Elite
Analyst: Chris Parnell
Sampling Media: Summa Canister(s)
Test Notes:

Date(s) Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 3/3/03
Volume(s) Analyzed: 1.00 Liter(s)
0.50 Liter(s)

Client Sample ID	CAS Sample ID	D.F.	Trichloroethene				Data Qualifier
			Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	
A6021703	P2300280-006	1.00	ND	0.050	ND	0.0093	
C1021703	P2300280-013	1.42	1.1	0.071	0.20	0.013	
C2021703	P2300280-014	1.25	0.89	0.063	0.17	0.012	
C2021703	P2300280-014DUP	1.25	0.89	0.063	0.17	0.012	
Method Blank	P030303-MB	1.00	ND	0.025	ND	0.0047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **A1021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-001

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00191

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/24/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -1.9 Pf 1 = 3.5

D.F. = 1.42

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.4	ND	0.56	
75-35-4	1,1-Dichloroethene	ND	1.4	ND	0.36	
75-09-2	Methylene chloride	7.4	1.4	2.1	0.41	
156-60-5	trans-1,2-Dichloroethene	ND	1.4	ND	0.36	
156-59-2	cis-1,2-Dichloroethene	2.9	1.4	0.74	0.36	
107-06-2	1,2-Dichloroethane	ND	1.4	ND	0.35	
71-43-2	Benzene	1.6	1.4	0.50	0.44	
79-01-6	Trichloroethene	8.2	1.4	1.5	0.26	
79-00-5	1,1,2-Trichloroethane	ND	1.4	ND	0.26	
108-88-3	Toluene	3.5	1.4	0.94	0.38	
127-18-4	Tetrachloroethene	ND	1.4	ND	0.21	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **A2021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-002

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00324

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/24/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -2.6 Pf 1 = 3.5

D.F. = 1.50

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.5	ND	0.59	
75-35-4	1,1-Dichloroethene	ND	1.5	ND	0.38	
75-09-2	Methylene chloride	13	1.5	3.7	0.43	
156-60-5	trans-1,2-Dichloroethene	ND	1.5	ND	0.38	
156-59-2	cis-1,2-Dichloroethene	4.4	1.5	1.1	0.38	
107-06-2	1,2-Dichloroethane	ND	1.5	ND	0.37	
71-43-2	Benzene	1.8	1.5	0.55	0.47	
79-01-6	Trichloroethene	8.4	1.5	1.6	0.28	
79-00-5	1,1,2-Trichloroethane	ND	1.5	ND	0.28	
108-88-3	Toluene	5.3	1.5	1.4	0.40	
127-18-4	Tetrachloroethene	ND	1.5	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
Client Sample ID: **A3021703**
Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
CAS Sample ID: P2300280-003

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00245

Date Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 2/24/03
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -4.2 Pf 1 = 3.5

D.F. = 1.73

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.7	ND	0.68	
75-35-4	1,1-Dichloroethene	ND	1.7	ND	0.44	
75-09-2	Methylene chloride	13	1.7	3.8	0.50	
156-60-5	trans-1,2-Dichloroethene	ND	1.7	ND	0.44	
156-59-2	cis-1,2-Dichloroethene	4.6	1.7	1.2	0.44	
107-06-2	1,2-Dichloroethane	ND	1.7	ND	0.43	
71-43-2	Benzene	1.8	1.7	0.55	0.54	
79-01-6	Trichloroethene	8.6	1.7	1.6	0.32	
79-00-5	1,1,2-Trichloroethane	ND	1.7	ND	0.32	
108-88-3	Toluene	5.1	1.7	1.3	0.46	
127-18-4	Tetrachloroethene	ND	1.7	ND	0.26	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **A4021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-004

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00160

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/24/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -2.4 Pf 1 = 3.5

D.F. = 1.48

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.5	ND	0.58	
75-35-4	1,1-Dichloroethene	ND	1.5	ND	0.37	
75-09-2	Methylene chloride	18	1.5	5.2	0.43	
156-60-5	trans-1,2-Dichloroethene	ND	1.5	ND	0.37	
156-59-2	cis-1,2-Dichloroethene	ND	1.5	ND	0.37	
107-06-2	1,2-Dichloroethane	ND	1.5	ND	0.37	
71-43-2	Benzene	ND	1.5	ND	0.46	
79-01-6	Trichloroethene	4.3	1.5	0.81	0.28	
79-00-5	1,1,2-Trichloroethane	ND	1.5	ND	0.27	
108-88-3	Toluene	4.3	1.5	1.1	0.39	
127-18-4	Tetrachloroethene	ND	1.5	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: A5021703
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280
CAS Sample ID: P2300280-005

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00099

Date Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 2/24/03
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -2.2 Pf 1 = 3.5

D.F. = 1.46

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.5	ND	0.57	
75-35-4	1,1-Dichloroethene	ND	1.5	ND	0.37	
75-09-2	Methylene chloride	16	1.5	4.5	0.42	
156-60-5	trans-1,2-Dichloroethene	ND	1.5	ND	0.37	
156-59-2	cis-1,2-Dichloroethene	2.9	1.5	0.73	0.37	
107-06-2	1,2-Dichloroethane	ND	1.5	ND	0.36	
71-43-2	Benzene	1.6	1.5	0.51	0.46	
79-01-6	Trichloroethene	15	1.5	2.8	0.27	
79-00-5	1,1,2-Trichloroethane	ND	1.5	ND	0.27	
108-88-3	Toluene	11	1.5	3.0	0.39	
127-18-4	Tetrachloroethene	ND	1.5	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: A6021703
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280
CAS Sample ID: P2300280-006

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00287

Date Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 2/24/03
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -14.2

Pf 1 = 3.5

D.F. = NA

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-43-2	Benzene	ND	1.0	ND	0.31	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
Client Sample ID: **B1021703**
Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
CAS Sample ID: P2300280-007

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00225

Date Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 2/25/03
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -2.3 Pf 1 = 3.5

D.F. = 1.47

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.5	ND	0.58	
75-35-4	1,1-Dichloroethene	ND	1.5	ND	0.37	
75-09-2	Methylene chloride	36	1.5	10	0.42	
156-60-5	trans-1,2-Dichloroethene	ND	1.5	ND	0.37	
156-59-2	cis-1,2-Dichloroethene	9.2	1.5	2.3	0.37	
107-06-2	1,2-Dichloroethane	ND	1.5	ND	0.36	
71-43-2	Benzene	1.6	1.5	0.50	0.46	
79-01-6	Trichloroethene	42	1.5	7.9	0.27	
79-00-5	1,1,2-Trichloroethane	ND	1.5	ND	0.27	
108-88-3	Toluene	6.4	1.5	1.7	0.39	
127-18-4	Tetrachloroethene	ND	1.5	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
Client Sample ID: **B2021703**
Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
CAS Sample ID: P2300280-008

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00339

Date Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 2/25/03
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -0.7 Pf 1 = 3.5

D.F. = 1.30

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.3	ND	0.51	
75-35-4	1,1-Dichloroethene	ND	1.3	ND	0.33	
75-09-2	Methylene chloride	31	1.3	9.0	0.37	
156-60-5	trans-1,2-Dichloroethene	ND	1.3	ND	0.33	
156-59-2	cis-1,2-Dichloroethene	3.4	1.3	0.86	0.33	
107-06-2	1,2-Dichloroethane	ND	1.3	ND	0.32	
71-43-2	Benzene	1.7	1.3	0.54	0.41	
79-01-6	Trichloroethene	20	1.3	3.7	0.24	
79-00-5	1,1,2-Trichloroethane	ND	1.3	ND	0.24	
108-88-3	Toluene	10	1.3	2.8	0.35	
127-18-4	Tetrachloroethene	ND	1.3	ND	0.19	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B3021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-009

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00293

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/25/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -1.6 Pf 1 = 3.5

D.F. = 1.39

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.4	ND	0.54	
75-35-4	1,1-Dichloroethene	ND	1.4	ND	0.35	
75-09-2	Methylene chloride	46	1.4	13	0.40	
156-60-5	trans-1,2-Dichloroethene	ND	1.4	ND	0.35	
156-59-2	cis-1,2-Dichloroethene	2.4	1.4	0.60	0.35	
107-06-2	1,2-Dichloroethane	ND	1.4	ND	0.34	
71-43-2	Benzene	1.6	1.4	0.51	0.44	
79-01-6	Trichloroethene	24	1.4	4.5	0.26	
79-00-5	1,1,2-Trichloroethane	ND	1.4	ND	0.25	
108-88-3	Toluene	7.0	1.4	1.9	0.37	
127-18-4	Tetrachloroethene	ND	1.4	ND	0.21	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B4021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-010

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00093

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/25/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -0.6

Pf 1 = 3.5

D.F. = 1.29

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.3	ND	0.50	
75-35-4	1,1-Dichloroethene	ND	1.3	ND	0.33	
75-09-2	Methylene chloride	20	1.3	5.7	0.37	
156-60-5	trans-1,2-Dichloroethene	ND	1.3	ND	0.33	
156-59-2	cis-1,2-Dichloroethene	3.1	1.3	0.78	0.33	
107-06-2	1,2-Dichloroethane	ND	1.3	ND	0.32	
71-43-2	Benzene	1.4	1.3	0.44	0.40	
79-01-6	Trichloroethene	17	1.3	3.1	0.24	
79-00-5	1,1,2-Trichloroethane	ND	1.3	ND	0.24	
108-88-3	Toluene	4.1	1.3	1.1	0.34	
127-18-4	Tetrachloroethene	ND	1.3	ND	0.19	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 3/6/03

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B5021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-011

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00107

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/25/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -5.4 Pf 1 = 3.5

D.F. = 1.96

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	2.0	ND	0.77	
75-35-4	1,1-Dichloroethene	ND	2.0	ND	0.49	
75-09-2	Methylene chloride	20	2.0	5.7	0.56	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ND	0.49	
156-59-2	cis-1,2-Dichloroethene	3.3	2.0	0.84	0.49	
107-06-2	1,2-Dichloroethane	ND	2.0	ND	0.48	
71-43-2	Benzene	ND	2.0	ND	0.61	
79-01-6	Trichloroethene	17	2.0	3.2	0.36	
79-00-5	1,1,2-Trichloroethane	ND	2.0	ND	0.36	
108-88-3	Toluene	4.4	2.0	1.2	0.52	
127-18-4	Tetrachloroethene	ND	2.0	ND	0.29	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 3/6/03

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B6021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-012

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00277

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/26/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -2.7 Pf 1 = 3.5

D.F. = 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.5	ND	0.59	
75-35-4	1,1-Dichloroethene	ND	1.5	ND	0.38	
75-09-2	Methylene chloride	13	1.5	3.8	0.44	
156-60-5	trans-1,2-Dichloroethene	ND	1.5	ND	0.38	
156-59-2	cis-1,2-Dichloroethene	2.4	1.5	0.62	0.38	
107-06-2	1,2-Dichloroethane	ND	1.5	ND	0.38	
71-43-2	Benzene	ND	1.5	ND	0.48	
79-01-6	Trichloroethene	11	1.5	2.0	0.28	
79-00-5	1,1,2-Trichloroethane	ND	1.5	ND	0.28	
108-88-3	Toluene	4.2	1.5	1.1	0.40	
127-18-4	Tetrachloroethene	ND	1.5	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **C1021703**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P2300280-013

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00352

Date Collected: 2/17/03
 Date Received: 2/20/03
 Date(s) Analyzed: 2/26/03
 Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -1.9 Pf 1 = 3.5

D.F. = 1.42

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.4	ND	0.56	
75-35-4	1,1-Dichloroethene	ND	1.4	ND	0.36	
75-09-2	Methylene chloride	ND	1.4	ND	0.41	
156-60-5	trans-1,2-Dichloroethene	ND	1.4	ND	0.36	
156-59-2	cis-1,2-Dichloroethene	ND	1.4	ND	0.36	
107-06-2	1,2-Dichloroethane	ND	1.4	ND	0.35	
71-43-2	Benzene	ND	1.4	ND	0.44	
79-01-6	Trichloroethene	ND	1.4	ND	0.26	
79-00-5	1,1,2-Trichloroethane	ND	1.4	ND	0.26	
108-88-3	Toluene	ND	1.4	ND	0.38	
127-18-4	Tetrachloroethene	ND	1.4	ND	0.21	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
Client Sample ID: **C2021703**
Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
CAS Sample ID: P2300280-014

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00428

Date Collected: 2/17/03
Date Received: 2/20/03
Date(s) Analyzed: 2/26/03
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -0.1 Pf 1 = 3.5

D.F. = 1.25

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.3	ND	0.49	
75-35-4	1,1-Dichloroethene	ND	1.3	ND	0.32	
75-09-2	Methylene chloride	ND	1.3	ND	0.36	
156-60-5	trans-1,2-Dichloroethene	ND	1.3	ND	0.32	
156-59-2	cis-1,2-Dichloroethene	ND	1.3	ND	0.32	
107-06-2	1,2-Dichloroethane	ND	1.3	ND	0.31	
71-43-2	Benzene	ND	1.3	ND	0.39	
79-01-6	Trichloroethene	ND	1.3	ND	0.23	
79-00-5	1,1,2-Trichloroethane	ND	1.3	ND	0.23	
108-88-3	Toluene	ND	1.3	ND	0.33	
127-18-4	Tetrachloroethene	ND	1.3	ND	0.18	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 3/6/03

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **Method Blank**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P030224-MB

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date(s) Analyzed: 2/24/03
 Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-43-2	Benzene	ND	1.0	ND	0.31	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 3/6/03

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
Client Sample ID: **Method Blank**
Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
CAS Sample ID: P030225-MB

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 2/25/03
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-43-2	Benzene	ND	1.0	ND	0.31	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 3/6/03

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **Method Blank**
 Client Project ID: **Grenada Indoor Air Sampling/23858.001**

CAS Project ID: P2300280
 CAS Sample ID: P030226-MB

Test Code: EPA TO-15
 Instrument ID: HP5973/Tekmar AUTOCAN Elite
 Analyst: Svetlana Walsh
 Sampling Media: Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date(s) Analyzed: 2/26/03
 Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-43-2	Benzene	ND	1.0	ND	0.31	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280

Surrogate Spike Recovery Results

Test Code: EPA TO-15 (SIM)
Instrument ID: Agilent 5973N/Tekmar AUTOCAN Elite
Analyst: Chris Parnell
Sampling Media: Summa Canister(s)
Test Notes:

Date Collected: 2/17/03
Date Received: 2/20/03
Date Analyzed: 3/3/03

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4		Toluene-d8		Bromofluorobenzene		Data Qualifier
		% Recovered	Acceptance Limits	% Recovered	Acceptance Limits	% Recovered	Acceptance Limits	
Method Blank	P030303-MB	101	70-140	103	70-140	95.0	70-140	
Lab Control Sample	P030303-LCS	103	70-140	103	70-140	94.7	70-140	
A6021703	P2300280-006	103	70-140	108	70-140	97.1	70-140	
C1021703	P2300280-013	105	70-140	106	70-140	95.1	70-140	
C2021703	P2300280-014	107	70-140	108	70-140	98.0	70-140	
C2021703	P2300280-014DUP	107	70-140	109	70-140	98.9	70-140	

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280

Surrogate Spike Recovery Results

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister(s)
Test Notes:

Date Collected: 2/17/03
Date Received: 2/20/03
Date Analyzed: 2/24 - 2/26/03

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4		Toluene-d8		Bromofluorobenzene		Data Qualifier
		% Recovered	Acceptance Limits	% Recovered	Acceptance Limits	% Recovered	Acceptance Limits	
Method Blank	P030224-MB	101	70-140	99.7	70-140	102	70-140	
Method Blank	P030225-MB	102	70-140	99.3	70-140	101	70-140	
Method Blank	P030226-MB	101	70-140	103	70-140	99.4	70-140	
Lab Control Sample	P030224-LCS	98.2	70-140	100	70-140	99.8	70-140	
Lab Control Sample	P030225-LCS	99.6	70-140	99.9	70-140	100	70-140	
Lab Control Sample	P030226-LCS	99.8	70-140	104	70-140	99.1	70-140	
A1021703	P2300280-001	99.5	70-140	100	70-140	99.1	70-140	
A1021703	P2300280-001DUP	101	70-140	99.3	70-140	99.2	70-140	
A2021703	P2300280-002	101	70-140	99.9	70-140	99.2	70-140	
A3021703	P2300280-003	101	70-140	101	70-140	101	70-140	
A4021703	P2300280-004	99.2	70-140	99.0	70-140	98.4	70-140	
A5021703	P2300280-005	100	70-140	99.2	70-140	97.1	70-140	
A6021703	P2300280-006	98.0	70-140	99.4	70-140	99.1	70-140	
B1021703	P2300280-007	100	70-140	101	70-140	101	70-140	
B2021703	P2300280-008	101	70-140	98.0	70-140	97.8	70-140	
B3021703	P2300280-009	101	70-140	98.6	70-140	98.8	70-140	
B4021703	P2300280-010	101	70-140	98.5	70-140	98.3	70-140	
B5021703	P2300280-011	98.8	70-140	100	70-140	100	70-140	
B6021703	P2300280-012	98.5	70-140	102	70-140	98.4	70-140	
C1021703	P2300280-013	100	70-140	101	70-140	96.4	70-140	
C2021703	P2300280-014	99.3	70-140	101	70-140	97.8	70-140	

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: Lab Control Sample
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280
CAS Sample ID: P030303-LCS

Laboratory Control Sample (LCS) Summary

Test Code: EPA TO-15 (SIM)
Instrument ID: Agilent 5973N/Tekmar AUTOCAN Elite
Analyst: Chris Parnell
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/03/03
Volume(s) Analyzed: N/A Liter

CAS #	Compound	Amount Spiked (ng)	Amount Recovered (ng)	% Recovery	CAS Acceptance Limits	Data Qualifier
79-01-6	Trichloroethene	0.0500	0.0517	103	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: Lab Control Sample
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280
CAS Sample ID: P030224-LCS

Laboratory Control Sample (LCS) Summary

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/24/03
Volume(s) Analyzed: N/A Liter

CAS #	Compound	Amount Spiked (ng)	Amount Recovered (ng)	% Recovery	CAS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	26.4	26.9	102	69.8-133	
75-35-4	1,1-Dichloroethene	25.0	25.4	102	60.2-120	
75-09-2	Methylene chloride	25.0	22.9	91.6	64.0-115	
156-60-5	trans-1,2-Dichloroethene	25.0	25.6	102	70.7-129	
156-59-2	cis-1,2-Dichloroethene	25.0	24.0	96.0	66.8-123	
107-06-2	1,2-Dichloroethane	25.0	24.5	98.0	64.2-132	
71-43-2	Benzene	25.0	24.4	97.6	71.1-120	
79-01-6	Trichloroethene	25.0	24.5	98.0	68.3-121	
79-00-5	1,1,2-Trichloroethane	25.0	23.8	95.2	67.8-134	
108-88-3	Toluene	25.0	24.1	96.4	59.0-127	
127-18-4	Tetrachloroethene	25.0	25.9	104	66.0-144	

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: Lab Control Sample
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280
CAS Sample ID: P030225-LCS

Laboratory Control Sample (LCS) Summary

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/25/03
Volume(s) Analyzed: N/A Liter

CAS #	Compound	Amount Spiked (ng)	Amount Recovered (ng)	% Recovery	CAS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	26.4	27.5	104	69.8-133	
75-35-4	1,1-Dichloroethene	25.0	25.0	100	60.2-120	
75-09-2	Methylene chloride	25.0	22.9	91.6	64.0-115	
156-60-5	trans-1,2-Dichloroethene	25.0	25.2	101	70.7-129	
156-59-2	cis-1,2-Dichloroethene	25.0	24.1	96.4	66.8-123	
107-06-2	1,2-Dichloroethane	25.0	24.5	98.0	64.2-132	
71-43-2	Benzene	25.0	24.3	97.2	71.1-120	
79-01-6	Trichloroethene	25.0	24.4	97.6	68.3-121	
79-00-5	1,1,2-Trichloroethane	25.0	23.5	94.0	67.8-134	
108-88-3	Toluene	25.0	23.6	94.4	59.0-127	
127-18-4	Tetrachloroethene	25.0	25.6	102	66.0-144	

Verified By: RC Date: 3/6/03

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: Lab Control Sample
Client Project ID: Grenada Indoor Air Sampling/23858.001

CAS Project ID: P2300280
CAS Sample ID: P030226-LCS

Laboratory Control Sample (LCS) Summary

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/26/03
Volume(s) Analyzed: N/A Liter

CAS #	Compound	Amount Spiked (ng)	Amount Recovered (ng)	% Recovery	CAS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	26.4	26.6	101	69.8-133	
75-35-4	1,1-Dichloroethene	25.0	23.2	92.8	60.2-120	
75-09-2	Methylene chloride	25.0	22.1	88.4	64.0-115	
156-60-5	trans-1,2-Dichloroethene	25.0	24.2	96.8	70.7-129	
156-59-2	cis-1,2-Dichloroethene	25.0	22.9	91.6	66.8-123	
107-06-2	1,2-Dichloroethane	25.0	23.6	94.4	64.2-132	
71-43-2	Benzene	25.0	23.0	92.0	71.1-120	
79-01-6	Trichloroethene	25.0	23.5	94.0	68.3-121	
79-00-5	1,1,2-Trichloroethane	25.0	22.0	88.0	67.8-134	
108-88-3	Toluene	25.0	23.8	95.2	59.0-127	
127-18-4	Tetrachloroethene	25.0	25.3	101	66.0-144	

CHAIN OF CUSTODY RECORDS



An Employee - Owned Company

Air Quality Laboratory
2665 Park Center Drive, Suite D
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Chain of Custody Record Analytical Service Request

Page 1 of 1

Client/Address Brown and Caldwell 501 Grant Circle Rd, Ste 150 Nashville, TN 37228		Project Name Grenada indoor air sampling		Analysis		CAS Project No. P2300280	
Phone 615-255-2288 Fax 615-256-8332		Project Number 23858.001		Expected Turnaround Time 24 Hr 48 Hr 3 Day 4 Day 5 Day		Cooler / Blank Temp _____	
Email jhousawke@brownandcaldwell.com		Sampling Location Grenada, MS		Comments (e.g., preservative or specific instructions)			
Contact Mary Hegelwe Jimmy How		P.O. #/Billing Information Same as Client address					
Client Sample ID	Date Collected	Time Collected	Lab Sample No.	Type of Sample	Container ID (Serial #)	Flow Controller (Serial #)	Sample Volume (Liters)
A1021703	2-7-03	11:36		AIR	A00091	F000273	6
A2021703		11:35			A000304	F000160	
A3021703		11:35			A000245	F000038	
A4021703		11:30			A000160	F000260	
A5021703		11:38			A000099	F000274	
A6021703		10:30			A000287	F000301	
B1021703		11:33			A000025	F000025	
B2021703		11:32			A000339	F000149	
B3021703		11:28			A000293	F000074	
B4021703		11:22			A000093	F000025	
B5021703		11:24			A000107	F000276	
B6021703		11:25			A000277	F000177	
C1021703		12:00			A000352	F000261	
C2021703		12:00			A000428	F000202	
					A000329	F000164	
Relinquished by: (Signature)	Date:			Time:	Received by: (Signature)		
					Sharon Malone		
Relinquished by: (Signature)	Date:			Time:	Received by: (Signature)		
Relinquished by: (Signature)	Date:			Time:	Received by: (Signature)		
Additional Comments See John Yokoyama on analysis instructions				Date: 2/20/03 11:00	Time: 11:00		

235

APPENDIX C

**ANALYTICAL LABORATORY RESULTS
FOR INDOOR AIR SAMPLES
AUGUST 2004**

APPENDIX C
ANALYTICAL LABORATORY RESULTS FOR INDOOR AIR SAMPLES
AUGUST 2004

LABORATORY REPORT

Client:	BROWN AND CALDWELL	Date of Report:	09/15/04
Address:	501 Great Circle Road, Suite 150	Date Received:	08/20/04
	Nashville, TN 37228	CAS Project No:	P2401823
Contact:	Mr. Jimmy Howsawkung	Purchase Order:	26322.001

Client Project ID: Grenada Indoor Air Sampling / 26322.001

Fourteen (14) Stainless Steel Summa Canisters labeled:

"A1081804"	"A2081804"	"A3081804"	"A4081804"	"A5081804"
"A6081804"	"B1081804"	"B2081804"	"B3081804"	"B4081804"
"B5081804"	"B6081804"	"C1081804"	"C2081804"	

The samples were received at the laboratory under chain of custody on August 20, 2004. The samples were received intact. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time that they were received at the laboratory.

Volatile Organic Compound Analysis

The samples were analyzed by combined gas chromatography/mass spectrometry (GC/MS) in SIM mode for selected volatile organic compounds. The analyses were performed according to the methodology outlined in EPA Method TO-15. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of an Agilent 5973N GC/MS/DS each interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.


The results of analyses are given in the attached data package. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Reviewed and Approved:


for

Chris Parnell
GCMS-VOA Team Leader
Air Quality Laboratory

Reviewed and Approved:


John Yokoyama
Operations Manager
Air Quality Laboratory

Page
1 of 209

Columbia Analytical Services, Inc.

Sample Acceptance Check Form

Client: Brown and Caldwell Work order: P2401823
 Project: Grenada Indoor Air Sampling/26322.001
 Sample(s) received on: 8/20/04 Date opened: 8/20/04 by: SM

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client or as required by the method/SOP.

		<u>Yes</u>	<u>No</u>	<u>N/A</u>
1	Were custody seals on outside of cooler/Box?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Location of seal(s)? _____ Sealing Lid?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were signature and date included?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were custody seals on outside of sample container?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Location of seal(s)? _____ Sealing Lid?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were signature and date included?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Were sample containers properly marked with client sample ID?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Did sample containers arrive in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Were chain-of-custody papers used and filled out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Did sample container labels and/or tags agree with custody papers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Was sample volume received adequate for analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Are samples within specified holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Was proper temperature (thermal preservation) of cooler at receipt adhered to?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Cooler Temperature <u>NA</u> °C			
	Blank Temperature <u>NA</u> °C			
9	Is pH (acid) preservation necessary, according to method/SOP or Client specified information?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Is there a client indication that the submitted samples are pH (acid) preserved?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were VOA vials checked for presence/absence of air bubbles?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	Tubes: Are the tubes capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Do they contain moisture?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11	Badges: Are the badges properly capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Are dual bed badges separated and individually capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Lab Sample ID	Required pH	pH (as received, if required)	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2401823-001			NA	
P2401823-002			NA	
P2401823-003			NA	
P2401823-004			NA	
P2401823-005			NA	
P2401823-006			NA	
P2401823-007			NA	
P2401823-008			NA	
P2401823-009			NA	
P2401823-010			NA	

Explain any discrepancies: (include lab sample ID numbers): _____

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Brown and Caldwell Work order: P2401823
Project: Grenada Indoor Air Sampling/26322.001
Sample(s) received on: 8/20/04 Date opened: 8/20/04 by: SM

Lab Sample ID	Required pH	pH (as received, if required)	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2401823-011			NA	
P2401823-012			NA	
P2401823-013			NA	
P2401823-014			NA	

RESULTS OF VOLATILE ORGANIC ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: A1081804
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P2401823-001

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00326

Date Collected: 8/18/04
Date Received: 8/20/04
Date(s) Analyzed: 8/27/04
Volume(s) Analyzed: 0.50 Liter(s)
 0.20 Liter(s)

Pi 1 = -2.7

Pf 1 = 3.5

D.F. = 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.076	ND	0.030	
75-35-4	1,1-Dichloroethene	ND	0.076	ND	0.019	
75-09-2	Methylene Chloride	0.38	0.30	0.11	0.088	
156-60-5	trans-1,2-Dichloroethene	ND	0.076	ND	0.019	
156-59-2	cis-1,2-Dichloroethene	0.45	0.076	0.11	0.019	
107-06-2	1,2-Dichloroethane	ND	0.076	ND	0.019	
71-43-2	Benzene	0.56	0.30	0.17	0.095	
79-01-6	Trichloroethene	0.64	0.076	0.12	0.014	
79-00-5	1,1,2-Trichloroethane	ND	0.076	ND	0.014	
108-88-3	Toluene	14	0.30	3.8	0.081	
127-18-4	Tetrachloroethene	0.13	0.076	0.018	0.011	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RL Date: 9/3/04

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: A2081804
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P2401823-002

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00364

Date Collected: 8/18/04
Date Received: 8/20/04
Date(s) Analyzed: 8/27/04
Volume(s) Analyzed: 0.50 Liter(s)
 0.10 Liter(s)

Pi 1 = -1.9 Pf 1 = 3.5

D.F. = 1.42

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.071	ND	0.028	
75-35-4	1,1-Dichloroethene	ND	0.071	ND	0.018	
75-09-2	Methylene Chloride	29	0.28	8.5	0.082	
156-60-5	trans-1,2-Dichloroethene	ND	0.071	ND	0.018	
156-59-2	cis-1,2-Dichloroethene	0.54	0.071	0.14	0.018	
107-06-2	1,2-Dichloroethane	0.34	0.071	0.084	0.018	
71-43-2	Benzene	1.8	0.28	0.58	0.089	
79-01-6	Trichloroethene	0.89	0.071	0.17	0.013	
79-00-5	1,1,2-Trichloroethane	ND	0.071	ND	0.013	
108-88-3	Toluene	16	0.28	4.2	0.075	
127-18-4	Tetrachloroethene	0.42	0.071	0.061	0.010	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Re Date: 9/2/04

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **A3081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-003

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00108

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/27 - 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.10 Liter(s)

Pi 1 = -2.8 Pf 1 = 3.5

D.F. = 1.53

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.077	ND	0.030	
75-35-4	1,1-Dichloroethene	ND	0.077	ND	0.019	
75-09-2	Methylene Chloride	23	0.31	6.7	0.088	
156-60-5	trans-1,2-Dichloroethene	ND	0.077	ND	0.019	
156-59-2	cis-1,2-Dichloroethene	0.55	0.077	0.14	0.019	
107-06-2	1,2-Dichloroethane	ND	0.077	ND	0.019	
71-43-2	Benzene	0.80	0.31	0.25	0.096	
79-01-6	Trichloroethene	0.86	0.077	0.16	0.014	
79-00-5	1,1,2-Trichloroethane	ND	0.077	ND	0.014	
108-88-3	Toluene	12	0.31	3.2	0.081	
127-18-4	Tetrachloroethene	0.41	0.077	0.061	0.011	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RGDate: 9/3/04

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **A4081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-004

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00537

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/27 - 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.10 Liter(s)

Pi 1 = -3.5 Pf 1 = 3.5

D.F. = 1.63

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.082	ND	0.032	
75-35-4	1,1-Dichloroethene	ND	0.082	ND	0.021	
75-09-2	Methylene Chloride	21	0.33	5.9	0.094	
156-60-5	trans-1,2-Dichloroethene	ND	0.082	ND	0.021	
156-59-2	cis-1,2-Dichloroethene	2.0	0.082	0.51	0.021	
107-06-2	1,2-Dichloroethane	ND	0.082	ND	0.020	
71-43-2	Benzene	0.63	0.33	0.20	0.10	
79-01-6	Trichloroethene	7.1	0.082	1.3	0.015	
79-00-5	1,1,2-Trichloroethane	ND	0.082	ND	0.015	
108-88-3	Toluene	8.4	0.33	2.2	0.087	
127-18-4	Tetrachloroethene	0.16	0.082	0.023	0.012	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Re Date: 9/3/04

Page No :

51

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: A5081804
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P2401823-005

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00603

Date Collected: 8/18/04
Date Received: 8/20/04
Date(s) Analyzed: 8/27/04
Volume(s) Analyzed: 0.50 Liter(s)

Pi 1 = -2.7 Pf 1 = 3.5

D.F. = 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.076	ND	0.030	
75-35-4	1,1-Dichloroethene	ND	0.076	ND	0.019	
75-09-2	Methylene Chloride	4.9	0.30	1.4	0.088	
156-60-5	trans-1,2-Dichloroethene	ND	0.076	ND	0.019	
156-59-2	cis-1,2-Dichloroethene	1.3	0.076	0.34	0.019	
107-06-2	1,2-Dichloroethane	ND	0.076	ND	0.019	
71-43-2	Benzene	0.78	0.30	0.24	0.095	
79-01-6	Trichloroethene	3.4	0.076	0.62	0.014	
79-00-5	1,1,2-Trichloroethane	ND	0.076	ND	0.014	
108-88-3	Toluene	3.7	0.30	0.98	0.081	
127-18-4	Tetrachloroethene	0.27	0.076	0.040	0.011	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Rcr Date: 9/3/04

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: A6081804
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P2401823-006

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00187

Date Collected: 8/18/04
Date Received: 8/20/04
Date(s) Analyzed: 8/27/04
Volume(s) Analyzed: 1.00 Liter(s)

Pi 1 = -14.3

Pf 1 = 3.6

D.F. = NA

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
75-35-4	1,1-Dichloroethene	ND	0.025	ND	0.0063	
75-09-2	Methylene Chloride	0.11	0.10	0.031	0.029	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
107-06-2	1,2-Dichloroethane	ND	0.025	ND	0.0062	
71-43-2	Benzene	ND	0.10	ND	0.031	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
79-00-5	1,1,2-Trichloroethane	ND	0.025	ND	0.0046	
108-88-3	Toluene	ND	0.10	ND	0.027	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Re Date: 9/3/04 **71**

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B1081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-007

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00224

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/27 - 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.010 Liter(s)

Pi 1 = -2.2

Pf 1 = 3.5

D.F. = 1.46

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.073	ND	0.029	
75-35-4	1,1-Dichloroethene	ND	0.073	ND	0.018	
75-09-2	Methylene Chloride	240	0.29	69	0.084	
156-60-5	trans-1,2-Dichloroethene	ND	0.073	ND	0.018	
156-59-2	cis-1,2-Dichloroethene	0.95	0.073	0.24	0.018	
107-06-2	1,2-Dichloroethane	ND	0.073	ND	0.018	
71-43-2	Benzene	0.57	0.29	0.18	0.091	
79-01-6	Trichloroethene	2.6	0.073	0.48	0.014	
79-00-5	1,1,2-Trichloroethane	ND	0.073	ND	0.013	
108-88-3	Toluene	2.6	0.29	0.68	0.078	
127-18-4	Tetrachloroethene	0.36	0.073	0.053	0.011	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Rc Date: 9/3/04

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B2081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-008

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00570

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/27 - 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.020 Liter(s)

Pi 1 = -4.2

Pf 1 = 3.5

D.F. = 1.73

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.087	ND	0.034	
75-35-4	1,1-Dichloroethene	ND	0.087	ND	0.022	
75-09-2	Methylene Chloride	110	0.35	31	0.10	
156-60-5	trans-1,2-Dichloroethene	ND	0.087	ND	0.022	
156-59-2	cis-1,2-Dichloroethene	1.8	0.087	0.46	0.022	
107-06-2	1,2-Dichloroethane	ND	0.087	ND	0.021	
71-43-2	Benzene	0.69	0.35	0.21	0.11	
79-01-6	Trichloroethene	5.1	0.087	0.95	0.016	
79-00-5	1,1,2-Trichloroethane	ND	0.087	ND	0.016	
108-88-3	Toluene	4.5	0.35	1.2	0.092	
127-18-4	Tetrachloroethene	0.72	0.087	0.11	0.013	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 9/3/04

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B3081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-009

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00518

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/27 - 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.10 Liter(s)

Pi 1 = -5.9 Pf 1 = 3.5

D.F. = 2.07

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.10	ND	0.041	
75-35-4	1,1-Dichloroethene	0.14	0.10	0.036	0.026	
75-09-2	Methylene Chloride	1.5	0.41	0.43	0.12	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.026	
156-59-2	cis-1,2-Dichloroethene	6.0	0.10	1.5	0.026	
107-06-2	1,2-Dichloroethane	ND	0.10	ND	0.026	
71-43-2	Benzene	0.55	0.41	0.17	0.13	
79-01-6	Trichloroethene	43	0.10	8.1	0.019	
79-00-5	1,1,2-Trichloroethane	ND	0.10	ND	0.019	
108-88-3	Toluene	4.4	0.41	1.2	0.11	
127-18-4	Tetrachloroethene	0.31	0.10	0.045	0.015	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B4081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-010

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00198

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/27/04
 Volume(s) Analyzed: 0.50 Liter(s)

Pi 1 = -5.0

Pf 1 = 3.5

D.F. = 1.88

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.094	ND	0.037	
75-35-4	1,1-Dichloroethene	ND	0.094	ND	0.024	
75-09-2	Methylene Chloride	ND	0.38	ND	0.11	
156-60-5	trans-1,2-Dichloroethene	ND	0.094	ND	0.024	
156-59-2	cis-1,2-Dichloroethene	3.1	0.094	0.77	0.024	
107-06-2	1,2-Dichloroethane	ND	0.094	ND	0.023	
71-43-2	Benzene	0.51	0.38	0.16	0.12	
79-01-6	Trichloroethene	7.4	0.094	1.4	0.017	
79-00-5	1,1,2-Trichloroethane	ND	0.094	ND	0.017	
108-88-3	Toluene	2.3	0.38	0.62	0.10	
127-18-4	Tetrachloroethene	0.12	0.094	0.017	0.014	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 9/3/04

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: B5081804
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P2401823-011

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: AC00574

Date Collected: 8/18/04
Date Received: 8/20/04
Date(s) Analyzed: 8/27/04
Volume(s) Analyzed: 0.50 Liter(s)

Pi 1 = -4.1 Pf 1 = 3.5

D.F. = 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.086	ND	0.034	
75-35-4	1,1-Dichloroethene	ND	0.086	ND	0.022	
75-09-2	Methylene Chloride	0.44	0.34	0.13	0.099	
156-60-5	trans-1,2-Dichloroethene	ND	0.086	ND	0.022	
156-59-2	cis-1,2-Dichloroethene	3.2	0.086	0.81	0.022	
107-06-2	1,2-Dichloroethane	ND	0.086	ND	0.021	
71-43-2	Benzene	0.50	0.34	0.16	0.11	
79-01-6	Trichloroethene	7.9	0.086	1.5	0.016	
79-00-5	1,1,2-Trichloroethane	ND	0.086	ND	0.016	
108-88-3	Toluene	2.9	0.34	0.78	0.091	
127-18-4	Tetrachloroethene	0.13	0.086	0.020	0.013	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **B6081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-012

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00604

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)

Pi 1 = -2.2

Pf 1 = 3.5

D.F. = 1.46

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.073	ND	0.029	
75-35-4	1,1-Dichloroethene	ND	0.073	ND	0.018	
75-09-2	Methylene Chloride	ND	0.29	ND	0.084	
156-60-5	trans-1,2-Dichloroethene	ND	0.073	ND	0.018	
156-59-2	cis-1,2-Dichloroethene	1.1	0.073	0.27	0.018	
107-06-2	1,2-Dichloroethane	ND	0.073	ND	0.018	
71-43-2	Benzene	0.48	0.29	0.15	0.091	
79-01-6	Trichloroethene	3.2	0.073	0.60	0.014	
79-00-5	1,1,2-Trichloroethane	ND	0.073	ND	0.013	
108-88-3	Toluene	3.5	0.29	0.93	0.078	
127-18-4	Tetrachloroethene	0.11	0.073	0.016	0.011	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Re Date: 9/3/04

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **C1081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-013

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00014

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.10 Liter(s)

Pi 1 = -2.8 Pf 1 = 3.5

D.F. = 1.53

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.077	ND	0.030	
75-35-4	1,1-Dichloroethene	ND	0.077	ND	0.019	
75-09-2	Methylene Chloride	20	0.31	5.7	0.088	
156-60-5	trans-1,2-Dichloroethene	ND	0.077	ND	0.019	
156-59-2	cis-1,2-Dichloroethene	1.9	0.077	0.47	0.019	
107-06-2	1,2-Dichloroethane	ND	0.077	ND	0.019	
71-43-2	Benzene	0.66	0.31	0.21	0.096	
79-01-6	Trichloroethene	6.8	0.077	1.3	0.014	
79-00-5	1,1,2-Trichloroethane	ND	0.077	ND	0.014	
108-88-3	Toluene	3.5	0.31	0.92	0.081	
127-18-4	Tetrachloroethene	0.12	0.077	0.018	0.011	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 9/2/04 **136**

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **C2081804**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P2401823-014

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:
 Container ID: AC00552

Date Collected: 8/18/04
 Date Received: 8/20/04
 Date(s) Analyzed: 8/28/04
 Volume(s) Analyzed: 0.50 Liter(s)
 0.10 Liter(s)

Pi 1 = -3.0 Pf 1 = 3.5

D.F. = 1.56

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.078	ND	0.031	
75-35-4	1,1-Dichloroethene	ND	0.078	ND	0.020	
75-09-2	Methylene Chloride	20	0.31	5.9	0.090	
156-60-5	trans-1,2-Dichloroethene	ND	0.078	ND	0.020	
156-59-2	cis-1,2-Dichloroethene	1.9	0.078	0.48	0.020	
107-06-2	1,2-Dichloroethane	ND	0.078	ND	0.019	
71-43-2	Benzene	0.62	0.31	0.19	0.098	
79-01-6	Trichloroethene	6.9	0.078	1.3	0.015	
79-00-5	1,1,2-Trichloroethane	ND	0.078	ND	0.014	
108-88-3	Toluene	1.6	0.31	0.42	0.083	
127-18-4	Tetrachloroethene	0.13	0.078	0.019	0.012	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **Method Blank**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P040827-MB

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date(s) Analyzed: 8/27/04
 Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
75-35-4	1,1-Dichloroethene	ND	0.025	ND	0.0063	
75-09-2	Methylene Chloride	ND	0.10	ND	0.029	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
107-06-2	1,2-Dichloroethane	ND	0.025	ND	0.0062	
71-43-2	Benzene	ND	0.10	ND	0.031	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
79-00-5	1,1,2-Trichloroethane	ND	0.025	ND	0.0046	
108-88-3	Toluene	ND	0.10	ND	0.027	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 9/3/04

Page No :

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Brown and Caldwell**
 Client Sample ID: **Method Blank**
 Client Project ID: **Grenada Indoor Air Sampling/26322.001**

CAS Project ID: P2401823
 CAS Sample ID: P040828-MB

Test Code: Modified EPA TO-15 (SIM)
 Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
 Analyst: Michelle Sakamoto
 Sampling Media: Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date(s) Analyzed: 8/28/04
 Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
75-35-4	1,1-Dichloroethene	ND	0.025	ND	0.0063	
75-09-2	Methylene Chloride	ND	0.10	ND	0.029	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
107-06-2	1,2-Dichloroethane	ND	0.025	ND	0.0062	
71-43-2	Benzene	ND	0.10	ND	0.031	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
79-00-5	1,1,2-Trichloroethane	ND	0.025	ND	0.0046	
108-88-3	Toluene	ND	0.10	ND	0.027	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 9/3/04

161

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823

Surrogate Spike Recovery Results

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:

Date Collected: 8/18/04
Date Received: 8/20/04
Date Analyzed: 8/27 - 8/28/04

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4		Toluene-d8		Bromofluorobenzene		Data Qualifier
		% Recovered	Acceptance Limits	% Recovered	Acceptance Limits	% Recovered	Acceptance Limits	
Method Blank	P040827-MB	102	70-140	99	70-140	98	70-140	
Method Blank	P040828-MB	96	70-140	97	70-140	105	70-140	
Lab Control Sample	P040827-LCS	98	70-140	99	70-140	97	70-140	
Lab Control Sample	P040828-LCS	94	70-140	98	70-140	105	70-140	
A1081804	P2401823-001	100	70-140	101	70-140	100	70-140	
A2081804	P2401823-002	94	70-140	99	70-140	101	70-140	
A2081804	P2401823-002DUP	94	70-140	98	70-140	101	70-140	
A3081804	P2401823-003	97	70-140	98	70-140	102	70-140	
A4081804	P2401823-004	97	70-140	99	70-140	101	70-140	
A5081804	P2401823-005	98	70-140	100	70-140	101	70-140	
A6081804	P2401823-006	102	70-140	100	70-140	96	70-140	
B1081804	P2401823-007	93	70-140	102	70-140	112	70-140	
B2081804	P2401823-008	93	70-140	101	70-140	106	70-140	
B3081804	P2401823-009	94	70-140	99	70-140	107	70-140	
B4081804	P2401823-010	93	70-140	100	70-140	108	70-140	
B5081804	P2401823-011	92	70-140	100	70-140	109	70-140	
B6081804	P2401823-012	93	70-140	101	70-140	110	70-140	
C1081804	P2401823-013	91	70-140	99	70-140	110	70-140	
C2081804	P2401823-014	92	70-140	98	70-140	109	70-140	

Verified By: RC Date: 9/3/04

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: Lab Control Sample
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P040827-LCS

Laboratory Control Sample (LCS) Summary

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/27/04
Volume(s) Analyzed: NA Liter

CAS #	Compound	Amount Spiked (pg)	Amount Recovered (pg)	% Recovery	CAS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	510	448	88	82-155	
75-35-4	1,1-Dichloroethene	525	512	98	61-123	
75-09-2	Methylene Chloride	520	529	102	62-123	
156-60-5	trans-1,2-Dichloroethene	530	518	98	63-129	
156-59-2	cis-1,2-Dichloroethene	520	514	99	63-125	
107-06-2	1,2-Dichloroethane	520	509	98	65-123	
71-43-2	Benzene	520	450	87	25-128	
79-01-6	Trichloroethene	520	495	95	73-139	
79-00-5	1,1,2-Trichloroethane	525	493	94	70-130	
108-88-3	Toluene	520	481	93	70-130	
127-18-4	Tetrachloroethene	520	502	97	70-134	

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: Brown and Caldwell
Client Sample ID: Lab Control Sample
Client Project ID: Grenada Indoor Air Sampling/26322.001

CAS Project ID: P2401823
CAS Sample ID: P040828-LCS

Laboratory Control Sample (LCS) Summary

Test Code: Modified EPA TO-15 (SIM)
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/28/04
Volume(s) Analyzed: NA Liter

CAS #	Compound	Amount Spiked (ng)	Amount Recovered (ng)	% Recovery	CAS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	510	415	81	82-155	L
75-35-4	1,1-Dichloroethene	525	504	96	61-123	
75-09-2	Methylene Chloride	520	503	97	62-123	
156-60-5	trans-1,2-Dichloroethene	530	489	92	63-129	
156-59-2	cis-1,2-Dichloroethene	520	486	93	63-125	
107-06-2	1,2-Dichloroethane	520	482	93	65-123	
71-43-2	Benzene	520	428	82	25-128	
79-01-6	Trichloroethene	520	494	95	73-139	
79-00-5	1,1,2-Trichloroethane	525	468	89	70-130	
108-88-3	Toluene	520	465	89	70-130	
127-18-4	Tetrachloroethene	520	509	98	70-134	

L = Laboratory control sample not within specified limits.

CHAIN OF CUSTODY RECORDS

